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THE SUGAR BEET IN GERMANY, WITH SPECIAL  
ATTENTION TO ITS RELATION TO CLIMATE<sup>1</sup>

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If the object of this paper were merely a recapitulation of what has been written upon the subject of the sugar beet or beet sugar, it would hardly be worth while. The literature is very extensive in quantity, but shows no very great variety. Much of it is repetition, in slightly modified form, of facts set forth in earlier works. In essentially no instance is the subject treated from a general geographic point of view. The purpose of this paper lies in an attempt to present the subject from such a viewpoint, with emphasis, however, in two directions, namely, (a) graphical representation of the statistics accompanied by an interpretation and (b) an inquiry into the relation between the sugar beet crop and climate. In order to establish somewhat of a background, some preliminary remarks not purely geographic must be introduced.

*Brief History.* The sugar beet is a cultivated product developed from the *Runkelrübe* (beet root), native, it seems, to the more moist parts of western and southern Asia. Although known probably as early as 500 B. C., it was not cultivated in Europe until the eighteenth century. Whether the common beet went first to China and then westward to Europe or followed some other course is still unsettled. It is fairly certain, however, that it finally reached Europe via the Mediterranean countries, beginning its general westward movement from Egypt, first following the coast to the east and

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<sup>1</sup> Prepared in the Department of Geography of the University of Leipzig, March, 1914. The writer expresses his appreciation to Professor Joseph Partsch for his ever-ready cooperation.

north and thence the north coast of the sea westward (1-5)<sup>2</sup>. It is interesting to note that to-day the sugar beet occurs relatively seldom in the fields of these Mediterranean lands.

Until the sugar beet arrived in Europe its value as a plant with a high sugar content was not appreciated. Only as the result of research by Andreas Marggraf in Berlin, then "Director of the Physical Section in the Academy of Sciences," was the fact revealed (1747) that the beet root contains a high percentage of common sugar. In 1801 the first *Fabrik*<sup>3</sup> was erected in Cunern, near Breslau in Silesia, by Franz Achard, a former student under Marggraf (3). This beginning was encouraged by the conquering Napoleon (3), who was sweeping all Europe before him. Realizing the value of home-produced sugar, he set up a prize of 100,000 francs for the economically successful production of sugar from a native plant. In addition, in 1812, he built four *Fabriken*, declared against further import of sugar and established a school in France where people might learn how to cultivate the plant and subsequently extract the sugar. However, when he died the industry in Germany became dormant, not again to become active until about 1840. Since this date the industry has fluctuated in activity, affected always by military as well as economic wars.

*Distribution.* The sugar beet, evolved since the days of Marggraf, has spread from Germany, where it has had its maximum development, to not only all European countries but across the seas to the Americas. The map (Fig. 1) indicates its occurrence only where grown in quantities commercially important. Its very limited area in contrast with the widespread distribution of sugar cane should be noted. Also the fact is worth noting that, despite the very ready adaptability of the plant, it is confined essentially to the intermediate zone, usually the cooler parts.

*Uses.* The very extensive use of beet sugar is not generally appreciated. Practically all the table sugar in Continental Europe is derived from the beet. Molasses and a coarse brown sugar, by-products of the refined white sugar, are of less consequence. The refined sugar reaches the market as "granulated," as "loaf-sugar"—cones weighing from 3 to 30 kilograms (6½ to 66 lbs.)—as "domino" or "lump-sugar," and as "pulverized" sugar. The demand for sugar

<sup>2</sup>The numbers in parentheses refer to the numbered references in the bibliography at the end of the paper.

<sup>3</sup>The German form and its plural, *Fabriken*, will be employed throughout to denote the building wherein the sugar is extracted from the beet. The English translation "factory" is hardly applicable.

does not stop at the dinner-table. Every manufacturer of chocolate, candies, jams, jellies, marmalades, fruit preserves, pastry, liquors and many other products uses tremendous quantities of sugar<sup>4</sup>. Such people are necessarily affected by every decided fluctuation in the sugar crop. Hence the cultivation of a plant with a very large sugar content and the improvement of processes for extracting and refining the sugar become vital problems.

*The Plant.* The scientific name of the cultivated sugar beet is *Beta altissima* (6), a variety derived from the common beet (*Futterröbe*), *Beta vulgaris*. A number of varieties have been developed,

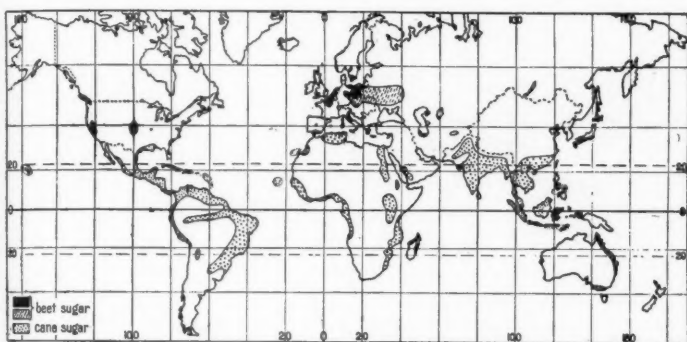


FIG. 1.—World distribution of beet sugar and cane sugar areas.

Outline adapted from Haack-von Seydlitz atlas, Gotha, 1913. Small scale of map necessitated considerable generalization.

Refs.—A. Scobel: *Handels-Atlas zur Verkehrs- und Wirtschaftsgeographie*, 1900-1902. E. Friedrich: *Geographie des Welthandels*, 1911. Haack-von Seydlitz: *Oberstufen-Atlas für höhere Lehranstalten*, 1913.

the most conspicuous of which can be classified into four groups (1):—(a) The Silesian white beet; (b) the Imperial beet in the Province of Saxony; (c) the small Wanzleben beet, quite generally distributed; and (d) the Vilmorin beet of French origin. In addition to these principal kinds a number of local types, valued very highly, have been developed. One of the better known is illustrated by Figure 2. The Delitzsch "Elite" has been cultivated in the region about Delitzsch, a small town ten miles north of Leipzig.

The shape of the beet is of prime consideration, since most of the sugar is contained within a distance equal to the width of two fingers measured from the top of the beet. For the concentration

<sup>4</sup> After the sugar has been extracted from the beet, a white fluffy mass representing the "apparent" waste remains. This is termed the *Schnitzel*. It is employed as a fertilizer and as food for stock, thus forming a sort of by-product of considerable value.

of the sugar here it is necessary that the beet taper rather symmetrically, yet tend toward a slight spiral form. It should also end in a very long tap-root (Fig. 2). The form of the beet in relation to the concentration of sugar constitutes a response to rainfall, to be discussed later.

(a) *Planting.* The seed is usually planted in April, that is, as soon as the ground is free from frost. Though it is sown to depths of only two and three centimeters, the soil must be deep. Just as soon as the plant appears above ground the work of cultivation begins. All of this work is accomplished by hand. Even



By permission of Dr. L. Kuntze, Director, Delitzsch Zucker-Fabrik.

FIG. 2—Delitzsch "Elite." Type of beet of highest quality developed in Delitzsch, Germany.

though the fields be not extensive, considerable labor is necessary, since the hand process is extremely slow. There is practically no time between the day of planting and that of harvesting when the sugar beet needs no attention. This gives rise to two important considerations, (a) the loss to the farmer in the event of crop failure and (b) the labor supply. The question of crop failure will be discussed in detail in the second section of this paper, where climatic relations are given special consideration.

A comparison of the map (Fig. 3a) showing the percentage of land devoted to sugar beet growing and that (Fig. 3b) showing the distribution of population or population density brings out a significant relationship. Where the population is dense, there is grown the sugar beet. It cannot be grown economically success-



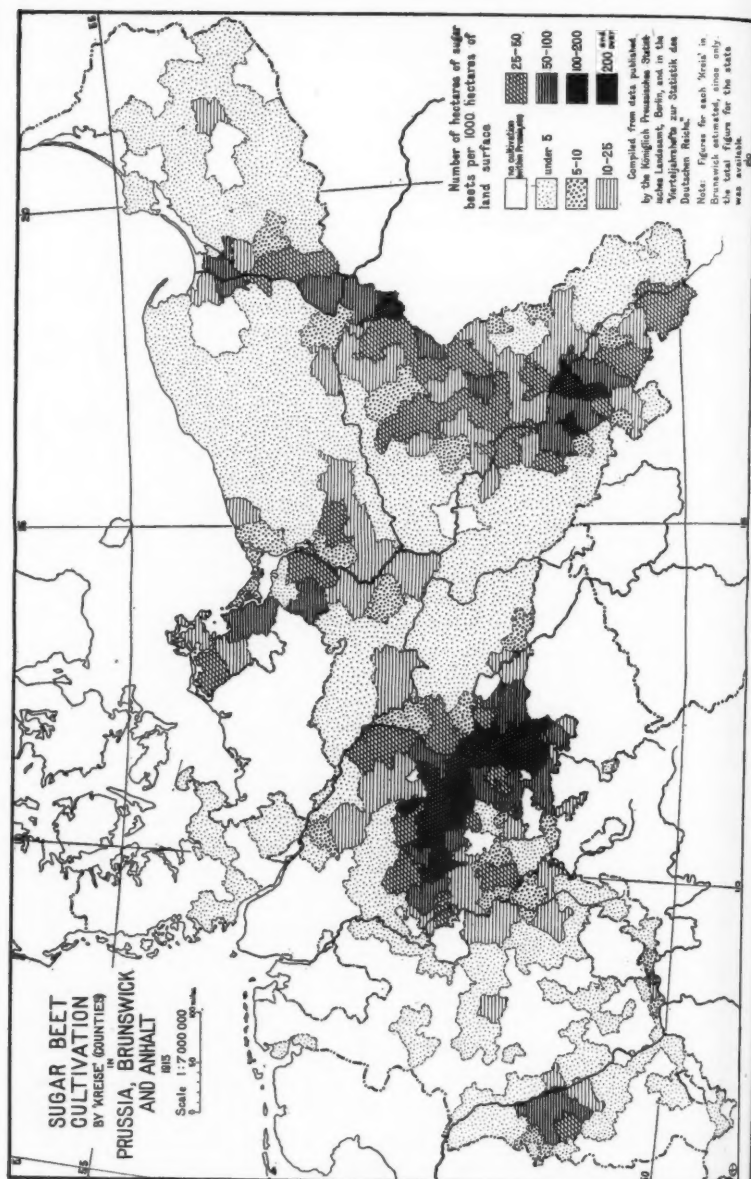
fully in a thinly populated district. The reasons therefor can be best discussed under two headings—harvesting and sugar extraction.

(b) *Harvesting.* The harvesting of the beet generally commences in October and continues for from four to six weeks. It must be completed within this period—that is, before heavy frosts set in. The plants are uprooted in most instances by a machine—work that is accomplished fairly rapidly. Next, from each plant the crown of foliage must be cut. As yet no machine is employed. Hence each beet must be handled, an exceedingly slow process. Further, those beets which are not taken to the *Fabrik* immediately must be piled in small heaps, but not covered.

The people who perform this labor are primarily women, girls and children—family labor. “A girl who is a very hard worker can harvest three-tenths of an acre in one day. She is paid at the rate of 9 marks (\$2.14) per six-tenths of an acre” (7). This rate assumes that the beets are piled in small heaps, whereas the statement as to the girl’s capacity does not include this process in her day’s work. As a matter of fact, her earning capacity ranges from 2 to 3 marks per day—i.e., 50 to 75 cents. The day generally begins at daybreak and terminates with the last rays of twilight. In the latitude of north Germany the number of hours between these extremes during the growing season is notably large. Such a low wage results in making work by individuals hardly profitable. By a number of members of a single family “clubbing together” the income for the family unit may be substantially enlarged. In addition to the resident labor a large importation is made, consisting of a more or less undesirable class of people from parts of eastern Germany and western Russia. These inroads in themselves give rise to difficult social problems.

(c) *Sugar Extraction.* A map showing the distribution of the *Fabriken* would coincide essentially with that giving the distribution of beets. The *Fabriken* are located as centrally as possible among the fields. Competition of the finished product with cane sugar demands this. Beet sugar must be sold at least as cheaply as cane sugar. The working margin is so close that if the beets must be hauled long distances by rail the freight charges resulting therefrom practically prohibit the extraction of the sugar. Hence most of the beets must be received from the fields without cost to the *Fabrik*<sup>5</sup>. This is accomplished by central location and delivery

<sup>5</sup>It might be noted incidentally that the *Fabriken* supply the seed free of charge in spring and therefore can demand this delivery under these conditions in the fall.



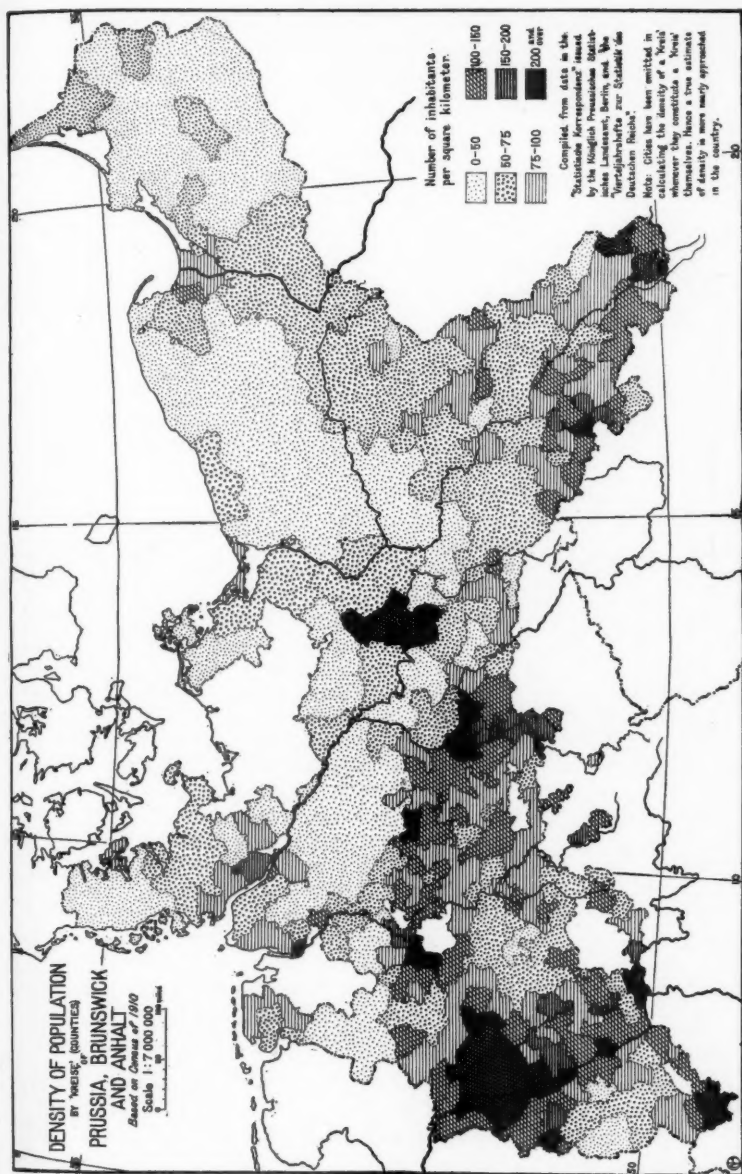


Fig. 3a.

in wagons by the farmers. Thus two very striking relationships present themselves here: (a) the relation between the distribution of population and dependent intensive agriculture and (b) the relation of location of a raw product to the development of its dependent industry.

*Soil.* The soil in which beets grow is classified as light or heavy. The light soils generally contain a maximum of sand with a mixture of clay or loam, or both; the heavy soils are principally clay or heavy loam with a mixture of sand. (Experimentally, the beet grows best in a lime soil (6).) "A loess soil with a smooth surface slightly inclined to the south, as little stony as possible, rich in

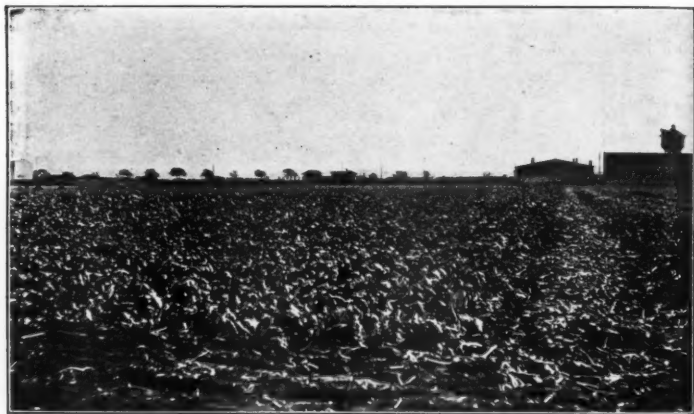


FIG. 4—A sugar beet field during harvest. Delitzsch.

humus, very deep, and a water-filled, non-pebbly subsoil, present the best conditions" (6). It is certain that the soil must be deep and underlain with a subsoil that drains well. The water table must always lie below the surface a distance equal to the greatest depth to which the tap-root will grow.

The heavy and light soils cover large parts of the north German glaciated plain. Although for years the sugar beet fields have occupied in most instances the soils of glaciated lands, recent developments point to the fact that such soils are not absolutely essential.

The productivity of the soil is maintained by the application of artificial fertilizers, by the use of barn manure and by crop rota-

tion. A few of the effective rotations are worth noting. While differing for different localities, their similarity is striking and interesting.

Where sufficient barley can be grown the rotation is as given in column 1 of the table below (1). "In the northwestern part of the Province of Posen, where sandy soil and fine clayey soils predominate," the rotation in column 2 is successful. (6) In Upper Silesia, where there are "heavy cold soils," the rotation indicated in column 3 seems best. "In general the rotation should occur in a three-year cycle. If, however, a four- or five-year rotation can be effected, so much the better" (7).

TABLE I—CROP ROTATION IN SUGAR BEET CULTIVATION

1	2	3
sugar beets	sugar beets or potatoes	sugar beets
potatoes	barley or oats	barley
oats	rye	rye
barley	sugar beets or potatoes	red clover
rye (winter varieties)	potatoes	sugar beets
wheat (" " )	barley or oats	barley or oats
sugar beets	clover	cereals in variety
	sugar beets	wheat
		sugar beets

*Climate.* The growing season covers six months, April to September inclusive (8). The first period may be divided into three parts, as follows: (a) April–May, with an average temperature of 10.7° C; (b) June–July, with an average temperature of 18.8° C; and (c) August–September, with an average temperature of 16.5° C. The average temperature for the whole period would thus be 15.3° C. (1). The rainfall for the first period should be about 97 mm, for the second period 114 mm and for the third period 100 mm. This is a rather uniform distribution, with, however, a significant maximum during the second period. All growers are not agreed upon these exact figures, though in general they are in accord upon the relative amounts. The rainfall of the first period should occur preferably during the latter half or toward the end of the period; that of the second period, always associated with warm weather, should be fairly evenly distributed; while the precipitation in the third period must fall during the first quarter or half, if it is not

to prove destructive. During the third period, especially in September and extending to the end of the harvest in October, much sunshine is essential.



FIG. 5—Driving in to be weighed. Seed warehouse in background. Delitzsch.

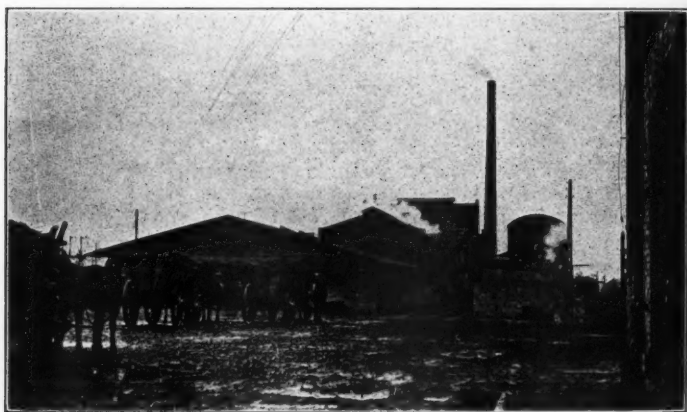


FIG. 6—General view of one of the largest sugar *Fabriken* in Germany. Delitzsch.

As to the effectiveness of sunshine, growers agree pretty well. Sunshine without doubt is the biggest factor in the actual formation of sugar in the plant. However, a difference of opinion exists

as to the relative efficiency of direct insolation and diffuse light. According to Dr. Kuntze<sup>6</sup>, "It is a well-established fact that the growth of sugar in the plant in so-called diffuse light proceeds more intensively and quickly than under the influence of direct sunlight."

Infrequent light frosts in autumn do not affect the beets; however, to frequent light frosts and to heavy frosts they are most sensitive. In consequence of this sensitiveness that part of the crop which is not removed to the *Fabrik* immediately after the harvest is stored in a *Miete*. A *Miete* is a mound of dirt two to three feet high and usually not over fifty feet in length, the



FIG. 7.—The more expensive form of delivery. Nearly all of these loads, however, represent a short haul. Delitzsch.

length varying according to the number of beets to be stored<sup>7</sup>. Its success is dependent upon the structure of the mound in relation to existent weather conditions. When frosts are light the covering of dirt must not be too thick, since the beets may become sufficiently warm to begin growing. On the other hand, when heavy frosts seem imminent then a layer, or several layers, of straw covered by more dirt must be added. Again, in this instance, the farmer must avoid making the bed too warm. Often it is advisable to remove this covering in part when the air temperature rises during the day

<sup>6</sup> Dr. Kuntze is director of the sugar *Fabrik* in Delitzsch and one of the foremost men in Germany as an authority on the subject of beet growing.

<sup>7</sup> Four of these mounds are built on one *Morgen* (.631 acre). This form of storage saves the expense of transfer to a warehouse and later from the warehouse to the *Fabrik*.



and to replace it at night. The fluctuations in temperature must be observed carefully to attain the best results.

In some instances these mounds are oriented with reference to the coldest winds. Thus in the region about Delitzsch the direction is nearly always NE-SW or E-W in response to the cold continental NE or E winds.

Aside from insect pests and diseases that occasionally materially affect the crop, failures or successes are usually accounted for on

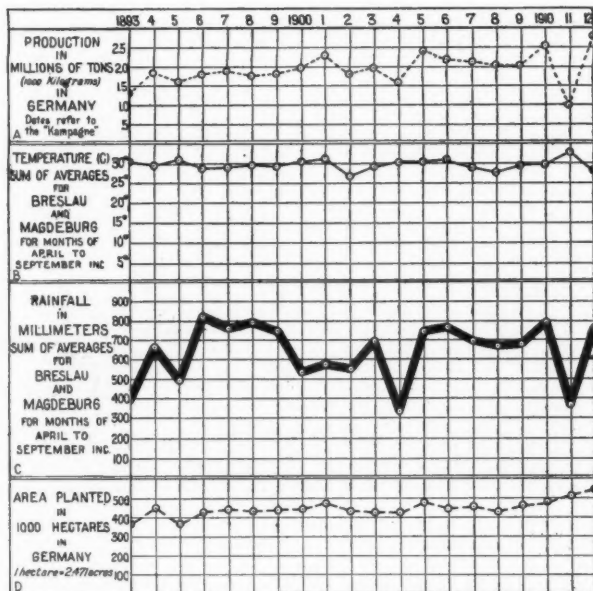


FIG. 8.—The apparent dependence of production (for a series of years) upon rainfall and temperature. Ref.—Rathke's *Adressbuch* and *Prussian Yearbook*.

the basis of a wet or dry year. Where the soil is light a relatively wet year is favorable, whereas in areas of heavy soils relatively dry years are desirable. These terms wet and dry refer particularly to the rainfall during the second period. If the rainfall on a heavy soil is abnormally high and the air warm, the beets will grow very rapidly, but the sugar content will be small. If these unusual rains occur in September and October that sugar which is stored in the upper part of the root will be dissipated and accord-

ingly a crop failure result. The failure will be especially considerable if the beets have assumed abnormal shapes, usually very wide at the top and short in length. Inasmuch as the sugar concentrates near the top it may be washed out by the rain waters more easily than in the normal form. At no time is a combination of heavy rainfall and low temperature encouraging.

"Upon light soils during wet years we not only have a large harvest of beets but the sugar content is large, since the beets on

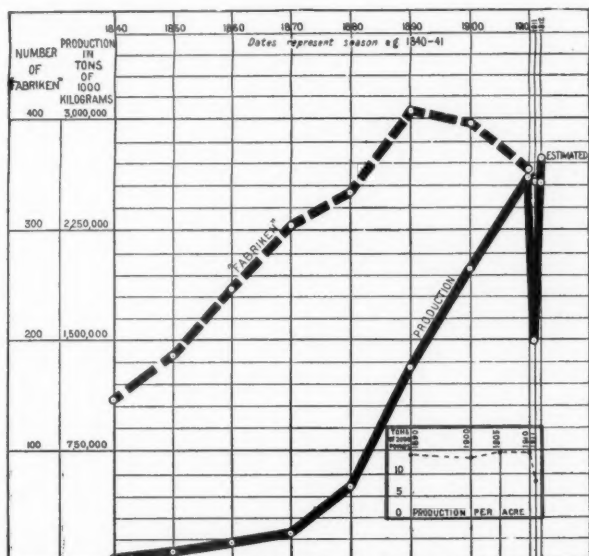


FIG. 9.—Relation of number of Fabriken to production, showing recent decrease in Fabriken with constant increase in production (except for 1911). Note decrease per acre also. Ref.—Rathke's Adressbuch.

the average polarize higher; further, they can be worked much more easily since the sugar crystallizes out of the sugar syrup quite readily. During dry years upon light soils, again, the beet possesses a high sugar content, but the sugar does not begin to crystallize out so readily as in wet years" (7).

**Production.** That the production of sugar beets has always tended to increase is illustrated by the upper and lower parts of Figure 8. The total area (9) planted in 1893 (Fig. 8D) was 386,481 hectares (1 hectare=2.471 acres) and in 1912 it reached

547,850 hectares. The production (9) of sugar during the *Kampagne*<sup>8</sup> 1893-4 (Fig. 8A) amounted to 1,366,001 tons (tons of 1000 kg) and in 1910-11 nearly doubled this amount, namely, 2,589,900 tons. The small crop of 1911 caused the production of sugar for the *Kampagne* 1911-12 to fall to 1,497,700 tons<sup>9</sup>, abnormally low.

Although the number of *Fabriken* has decreased within the past 12 years (Fig. 9), the production of sugar has in general increased very rapidly. This is due not so much to geographic factors as to the skill and ingenuity of the chemists and engineers, who have steadily improved processes. The consolidation of a number of the smaller *Fabriken* with the larger ones has also been a factor. The detailed curve in Figure 8A gives some idea as to the deviations from the general tendency toward increase in production. Though the causes of the years of decrease will be discussed in detail later,

it will not be amiss to state here incidentally that the decrease in rainfall for the two principal beet-growing districts, Breslau and Magdeburg, was coincident, and further that in 1904 and 1911, years of largest fluctuation, the temperature rose considerably, in the latter year unusually so.

(a) *Rank in Production.* Although in area planted sugar beets rank seventh (Fig. 10) among the leading crops, the quantity of

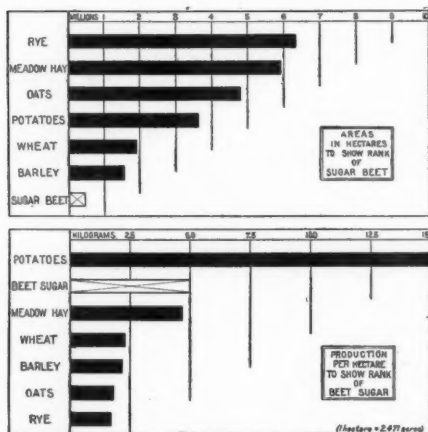


FIG. 10—The rank of the sugar beet versus the rank of beet sugar. Based on data from *Vierteljahrshefte zur Statistik des Deutschen Reichs*, 1912.

sugar extracted, when ranked with the production of the same items, takes second place. Upon making inquiry into the value of the sugar beet compared with that of the products with which it is rotated and incidentally here ranked, the following statement was received: "With a normal crop, the sugar beet is the most

<sup>8</sup> *Kampagne* is the winter season during which the sugar is extracted from the beets just harvested.

<sup>9</sup> The production per acre, shown in the inset on Figure 9, has tended to decrease.

profitable, since in addition to providing sugar both the beet *Kraut* (leafy crown) and the *Schnitzel* constitute valuable food for the stock." Further, "If one takes an average for a series of years, the profits always remain greater than those for grains" (10).

Germany is the leading beet sugar country (Fig. 11). Its present production approximates very closely one-third of the world's total. Russia does not fall far behind. Whether or not Germany needs to fear Russian competition is a question too complicated to discuss here.

(b) *Beet Sugar and Cane Sugar.* Figure 12 illustrates an interesting contest for supremacy in the output of sugar. Until 1905 beet sugar always led cane sugar. Subsequently the output

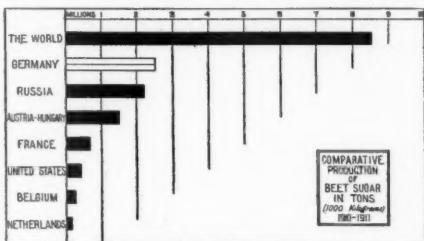


FIG. 11—Germany's rank among the beet producing countries. Ref.—*Rathke's Adressbuch*.

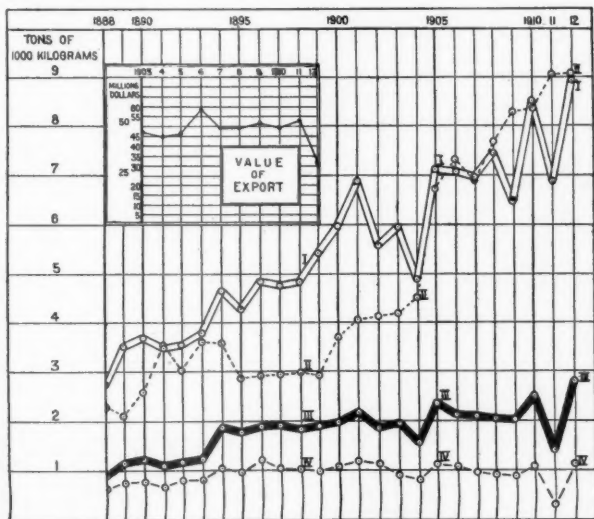


FIG. 12— I—Beet sugar production of the world  
 II—Cane " " " " "  
 III—Beet " " " Germany  
 IV—Beet " export of Germany } 25 years.  
 Inset—Value of German export for series of 10 years.

of both has been very nearly equal, cane sugar having a slight advantage. Still, beet sugar has been none the less important upon the world's markets. The influence of Germany upon the world's output is illustrated in part at least by curves I and III in Figure 12. The fluctuations in both are essentially parallel, the years 1890, 1894, 1895, 1901 to 1905, 1911, and 1912 being especially noteworthy.



FIG. 13—Consumption of sugar in kilograms per capita among the nations, 1911-12.  
Ref.—Ruthke's Adressbuch.



FIG. 14—Destination of Germany's beet sugar export. 1 Doppel-Zentner (dz.)=100 kilograms =220.4 pounds. In 1911-12 the largest export was made to Great Britain, Switzerland, Norway and Uruguay.

On the other hand, variations in the output of cane sugar are not noticeably reflected in the curve for the world's output.

*Commerce: (a) Consumption.* The per capita consumption of sugar in Germany is fifth in rank among the nations, as shown by Fig. 13. This rank is the more significant since the four countries which have a larger consumption produce very little beet sugar. The United States is the only one of these which produces a considerable quantity of sugar, and that primarily cane sugar. The consumption per capita in Germany has increased from 7.19 kgs. in 1888 to 18.8 kgs. in 1911. The figure for 1911 represents about one-half the total production. Since the countries which lead Germany in consumption produce so little sugar, there should be a ready market for Germany's surplus.

*(b) Export.* The export to individual countries from year to

year fluctuates very widely. Hence it is impossible to present a graph of the average export to these countries. Figure 14 indicates the countries involved<sup>10</sup>. The wide distribution of the export both among European countries and among American countries

<sup>10</sup>The value of the export for a series of years appears in the inset in Figure 12.

deserves notice. The demand from so many different sources coupled with Germany's ability to supply it opens an avenue for trade not alone in this product but naturally in others—hence another reason for the keen interest which Germany should show toward the sugar beet and beet sugar.

*Significance to Germany.* Upwards of 100,000 people (11) are employed in the German beet sugar industry. Should the export decrease suddenly after a year of normal crop, the following year would witness a decided decrease in area planted, in harvest and accordingly in the number of people employed. This is a possibility, since, as above indicated, cane sugar occupies a place on the market and must be reckoned with. As the annual production of cane sugar continues to increase rapidly, beet sugar seems destined to take second place<sup>11</sup>. The reasons are fairly obvious. The varieties of sugar are chemically the same; however, the personal experience not alone of the writer but of many others, including some who are intimately associated with the industry, gives evidence that cane sugar has a very much greater sweetening capacity—a fact tending in itself to swing favor in its direction. If the prices of these two sugars are the same, as proves to be true, then certainly the consumer will choose the sweeter variety. Unless the choice is controlled artificially, the consumption of beet sugar must decline and therefore crop production must likewise decrease.

Reference to Figure 12 again brings to light the fact that since 1899, excepting only 1907, the output of cane sugar has never fallen off. The story for beet sugar is quite in contrast. But reliability is a crowning virtue. If the merchant realizes that each year the available quantity of cane sugar is certain, whereas that of beet sugar is uncertain, then there remains no question as to which of the two he will handle. The question "Why is there a difference in degree of certainty?" follows quite naturally. The answer is a rather serious one for Germany.

That both of these varieties are influenced by their climatic environment can hardly be gainsaid. It is true that the sugar beet possesses a rather remarkable adaptability to various climates and soils; nevertheless, the map of distribution and some facts to be discussed below present rather convincing evidence that climate still controls. This is Germany's largest handicap in its problem of beet cultivation.

<sup>11</sup> Review of export for 1912-13 (16), which was unusually small. The decrease may be accounted for on the "basis of an unexpected and unprecedented crop in Cuba and the advantage in duties which Cuba has over other sugar-growing regions."

Cane sugar grows where the elements of climate are fairly certain; it grows where labor is even cheaper than in Germany; its cultivation probably demands less attention, and, finally, the harvesting is simpler and easier. In Germany the area possible for the spread of the sugar beet is limited. So far as concerns the present it is about as extensive as possible; the moorlands offer a future provided only that cane sugar does not continue to increase as in the past. The tropics are only beginning to be penetrated; sugar cane is just commencing to be cultivated systematically. That the output of the latter is destined to surpass and possibly even suppress that of the sugar beet, and therefore beet sugar, is hardly to be doubted.

If the beet sugar industry is to be preserved in Germany, in all probability only a high tariff on imported cane sugar can act as a safeguard. There still remain possibilities in the improvement of the variety of the beet and in processes of sugar extraction and refining, but these can accomplish hardly more than the maintenance of the present relation to cane sugar for a little while longer.

Aside from a whole series of artificial factors, principally political, the sugar beet at the present time suffers most of all from climatic influences. Though these cannot be overcome entirely, they can probably be met and solved in part. This is Germany's most important work at home for the improvement and continuance of the industry. The close relation existing between the growth of the sugar beet and the variations in the climatic elements is discussed in the following section.

*(To be concluded)*



## THE IDENTITY OF THE SANPO AND DIHANG RIVERS

In his introduction to *Records of the Survey of India*, Vol. 4,<sup>1</sup> Colonel Burrard says:

"One of the least known portions of Asia is the mountainous area situated between the Dihang and the Yangtze Kiang. This region embraces the principal basins of the rivers Mekong, Salwin and Irrawaddy and the Himalayan catchment areas of the four principal feeders of the Brahmaputra, namely, the Luhit (Zayul), the Dibang, the Dihang and the Subansiri. The scantiness of its population, the denseness of its jungle, the altitude of the ranges, the steep precipices and the torrential streams have rendered this tract a serious obstacle to communication between India and China and between Tibet and Burma. For many years, the populous and cultivated plains of Assam have been coterminous with unexplored hills. A sharp geographical line has separated the known from the unknown, civilization from savagery. In 1911 it was decided to extend our geographical knowledge, and four detachments were organized to survey the North-East Frontier of India along a line, 600 to 700 miles in length, from the east of Burma to the north of Assam."

This volume contains a narrative report of these survey operations. Some idea of the value of this survey work may be gained from the fact that 28,000 square miles of hitherto unexplored country were surveyed. This large region is one of the most impassable in the world. The Karakoram and the Hindu Kush have presented great difficulties to earlier surveyors and their forms have only been represented on maps by field workers after much hardship and privation. "But in some ways the mountains of the North-East Frontier are more difficult than those of the North-West. They are pathless, tractless and covered in places by thick jungle." But the survey officers have brought their work to a successful conclusion in spite of the great natural obstacles they had to surmount.

This notice of the work will, however, be confined to a brief summary of the results of the Abor Expedition which has, at last, pro-

<sup>1</sup> Explorations on the North-east Frontier during 1911-12-13. Prepared under the direction of Colonel S. G. Burrard, C.S.I., R.E., F.R.S., Surveyor General of India. 91 pp. Map, illus. Calcutta, 1914. 6s.

vided proof that the Sanpo River of Tibet and the Dihang of Assam are one and the same river forming the upper course of the Brahmaputra. This fact has been accepted for many years on the authority of Kinthup, an humble Indian traveler, though his credibility was long doubted by many.

In the opinion of Colonel Burrard the most striking geographical results of all these operations have been "the discovery by the Abor survey party of the peak of Namcha Barwa, 25,445 feet high. This is the highest known peak east of Kinchinjunga

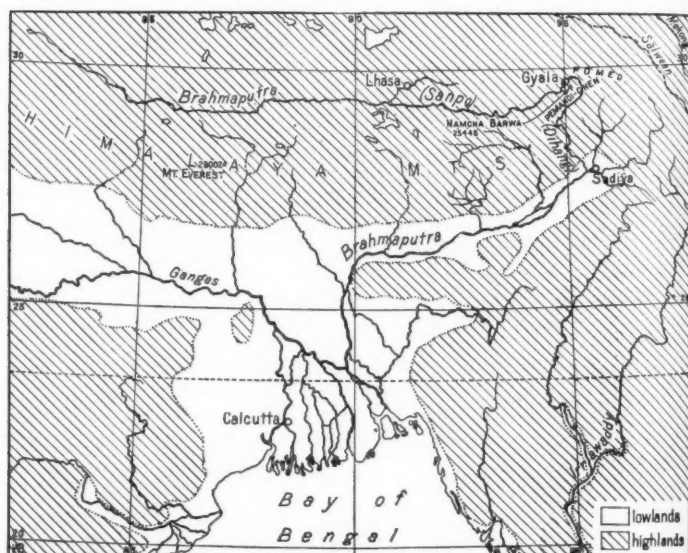


FIG. 1.—The course of the Brahmaputra, showing the continuity of the sections known as the Sanpo and the Dihang. 1:15,400,000. The recently established transverse course of the river through the Himalayas (— the Dihang) is based on a map in the report mentioned in footnote 1.

[28,146 feet and the third highest known mountain in the world], and its discovery has taken geographers by surprise. Immediately east of Kinchinjunga is the peak of Chumalhari (23,930) and further east in Central Bhutan stand the twin peaks of Kulhakangri (24,740), but no peaks above 10,000 feet have been found in the Himalayas of Assam east of longitude 93°. The discovery that Assam possesses a peak almost equal in height to Nanva Devi (25,645) marks an epoch in the history of Himalayan explorations. The

great peak of Assam far surpasses in height all the snow peaks visible from Mussoorie and Simla."<sup>2</sup>

The report of Capt. O. H. B. Trenchard, R.E., leader of the Abor expedition (pp. 39-76), gives many details of the survey operations. It was found that after the Sanpo leaves Tibet, by cutting its way through the Himalayas from west to east, about longitude 95° E., in a gorge so utterly precipitous as to make it impossible for any man or animal to traverse it, it enters the country of Pemakoi-chen through which it flows, roughly speaking, in a south-westerly direction. The valley of the Dihang in this country (between 29° - 30° N.) is narrow with an average width of 30-40 miles, is bounded on the right bank by the well-defined, main Himalayan range and on the left bank by the equally well-defined and regular watershed between the Dihang and the Dibang Rivers.

The report says: "The identity of the Sanpo and the Dihang as one and the same river has been established to all intents and purposes. Kinthup's statement that the Sanpo broke through the Himalayas from Tibet to Pemakoi-chen in a deep gorge has been confirmed. The position of this gorge has been fixed with a fair degree of exactitude and only a short length of the Dihang River (probably not more than thirty miles measured along the bends of the river) has not been surveyed, though we are able to show this small portion on the map with tolerable certitude from local information pending the final confirmation of Captain Morshead's surveys."<sup>3</sup>

The survey of the Abor expedition fully confirms the approximate accuracy of the Indian traveler Kinthup, whose work was discredited by many critics. In 1878 the Indian survey sent a man known as G. M. N., a Lama in a Sikkim monastery, to Tibet in order to follow the course of the Sanpo and solve the problem of its destination. Kinthup, a native of Sikkim, accompanied G. M. N. as assistant. They followed the Sanpo eastward as far as the village of Gyala, near the western end of the big gorge through the Himalayas, and then returned to India.

In 1880 a Chinese Lama was engaged to continue G. M. N.'s exploration of the Sanpo. Kinthup was employed to accompany him.

<sup>2</sup> This peak was seen by explorer Nem Singh in 1879, by explorer Kinthup in 1881 and by Captain C. L. Robertson, R.E., from the Mishmi side in 1900; but Lieut. G. F. T. Oakes, R.E., and Lieut. J. A. Field, R.E., were the first to determine its height, on the present expedition, in 1912.

<sup>3</sup> Captain Morshead's surveys were not ready for printing when this volume of the *Records* was issued. But Capt. Trenchard says "these will also confirm and of course correct the sketch map."

They reached Tibet and proceeded down the Sanpo to Gyala, where they crossed to the left bank and continued their journey to Pomed. On reaching Tong-juk Dzong, in May, 1881, the Chinese Lama sold

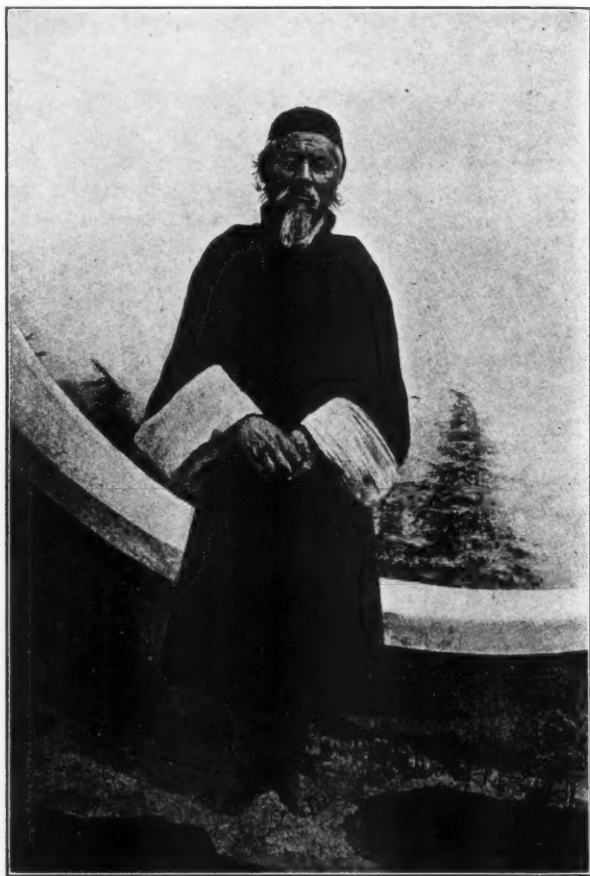


FIG. 2—Kinthup, the explorer, who first explored the Sanpo through the great Himalayan Range, 1880-1883.

From a photograph taken by Lieut. G. Burrard in 1914.

Kinthup as a slave and decamped with the proceeds. All of Kinthup's instruments and note-books were taken from him, and he had to work for his master until March, 1882, when he managed to make

his escape into Pemakoi-chen. He finally reached the monastery of Marpung, on the right bank of the Dihang, and was kindly received by the head Lama, whom he served while he remained in that region. He managed on several occasions to obtain leave of absence from Marpung on pretense of visiting holy places and thus carried out several extended journeys of explorations. At last he was able to return to India, which he reached in November, 1884, after four years' absence. Kinthup's story was not taken down and translated until two years after his return, when Colonel Tanner compiled a sketch map of the Dihang basin from Kinthup's narrative. This map has been the sole geographical record of the Dihang basin from that day to the present.

Kinthup was not a trained explorer. All his instruments, notebooks, etc., were stolen from him early in his journey and he had therefore to rely entirely on his memory in giving an account of his travels, extending over four years and covering a large area. But in view of all the evidence he adduced, few geographers have doubted the fact that the Sanpo and Dihang were the same river and formed the upper Brahmaputra. It only remained for a scientific survey to supply the final proof, which has now been done.

The Report examines Kinthup's work in the light of the recent surveys now reported by the Abor Expedition. It was all the more important to do this because certain geographers have recently expressed the opinion that Kinthup's geographical information about the Dihang Basin was merely collected by him in Tibet without even visiting the Dihang Valley and was therefore unreliable; but Captain Trenchard's report finds that, considering the fact that Kinthup was unable to keep a record of his travels, the accuracy of his account is remarkable.

First, the accuracy of his names is very striking. In Pemakoi-chen and the Abor country he gives fifty-seven names, of which thirty-four fall within the area recently surveyed. Of these thirty-four names only six were not found: two being names of camps or caves, one a village since deserted, while the other three might well be known now under different names. Of the remaining twenty-three names which Kinthup gives beyond the area recently surveyed, all except three have been confirmed by information obtained locally. Second, his description of the physical features of the different parts in which he traveled is remarkably correct. As a rule, it would be impossible to give a more accurate description in so few words. Captain Trenchard's report ends with these words:

"In short, the theory that Kinthup must have ascended some high mountain in Tibet overlooking the Dihang Basin, from which all the villages on the Dihang were pointed out and described to him and that he merely committed all these names, details of routes, etc., to memory without leaving Tibet, is utterly ridiculous, especially when advanced by those who had themselves visited even a small portion of this Dihang Basin.

"His account has been confirmed in the most remarkable manner, and we are now able to establish Kinthup's claim to honorable record in the annals of the Survey of India, which he served with such zeal and devotion to duty."

The portrait of Kinthup reproduced here is one of the two that accompany Trenchard's report. The legend under the picture is reproduced exactly from that under the original photo-engraving. While substantial justice has long been rendered by most geographers to the value of his work, it is gratifying to have the importance of his geographical achievements fully substantiated by the Survey of India.

Inasmuch as the Dihang drops from an elevation of 9,000 feet to 1,000 feet above sea-level in a distance of about 100 miles, it might be reasonable to suppose that there were high falls along its course. No such falls, however, have been discovered, but for a very long distance the rapids are almost incessant. It may be noted here that other large rivers of the Himalayas drop great distances, but have no falls. Thus, as Col. Burrard remarks on p. 3, the Sutlej drops from 10,000 feet to 1,000 feet, but possesses no falls; the Ganges drops from 12,000 feet to 1,000 feet and there are no falls in the river. The average gradient of the Kali in Eastern Kumaun is perhaps greater than that of any other Himalayan river, but there are no falls upon it.

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FIG. 1—Block diagram showing topography of eastern Europe.

Key to place names :—A, Allenstein; B, Biala; Br, Bromberg; D, Debica; Dr, Drohobycz; Le, Leczyca; Lo, Lowicz; P, Piotek; R, Raba; Rz, Rzeszow; S, Sejny; Tn, Tannenberg.



of eastern theatre of war.

, Drohobycz; Du, Dunajec; G, Grodek; J, Jozefow;  
Tannenberg; Tte, Tarnow; W, Wislok; Wa, Wisloka.



## GEOGRAPHIC ASPECTS OF THE WAR

By DOUGLAS WILSON JOHNSON

Associate Professor of Physiography, Columbia University

### II.—THE EASTERN CAMPAIGN

In the *Bulletin* for March I described those surface features of western Europe which have exercised an important influence upon the western campaign. It is the object of the present paper to present a picture of the broader topographic features of that portion of eastern Europe traversed by the Russian and Austro-German forces, and to discuss the influence of this topography upon the plans of campaign and the movements of armies during the first six months of the war. As in the former paper, the more striking surface forms are represented by a block diagram, which makes no pretension to accuracy, so far as details are concerned, but which will assist the reader in grasping the more important topographic elements of the region.<sup>1</sup>

*General Physiography.* A rectangular area, including East Prussia on the north, Poland in the middle, and Galicia on the south, is all we need here consider. Across the southern border of the area the Carpathian Mountains curve eastward and southeastward in a great arc. Along the middle portion of their course they consist of a belt of maturely dissected folded mountains, sixty miles wide, in which long parallel ridges of resistant sandstones remind an American of the folded Appalachians, while subsequent streams have eroded parallel valleys along the weaker beds. The parallelism of topographic elements is most pronounced along the northeast side of the belt; and the Carpathians differ from the American system in being more massive along the southwestern side, where crystalline rocks appear, while a somewhat irregular crestline of greater altitude separates the two dissimilar areas. Like the American ridges, those of the Carpathians are well forested.

No rivers cut across the crest line in this part of the range, but half a dozen fairly accessible passes, from 1,200 to more than 2,000 feet high, permit roads and railroads to cross from the low plain of Hungary on the southwest to the plains of Galicia on the northeast. Among these we have heard most frequently of the Dukla, Lupkow and Uzsok Passes, because of their peculiar strategic importance. Along the northeastern base of the Carpathians we may note the location of three cities: Jaroslaw and Przemyśl near the center of the arc, two important fortress cities, access to which from Hungary is commanded by the three passes just mentioned; and Cracow, another fortified city near the head of the Vistula Valley, whence easy gateways open into Austria and by way of the Oder Valley into Silesia.

<sup>1</sup> The drawing of this diagram is almost entirely the work of Mr. A. K. Lobeck, a graduate student in geography at Columbia University, to whom I am indebted for the skill and labor bestowed upon it.

Large copies of the diagram illustrating last month's article on the western theatre of war, for use in recording changing positions of armies as affected by topography, may be secured from Columbia University Bookstore, New York City, at a cost of fifty cents each. Size of diagram 29 x 17 inches.

Many rivers flow northward and northeastward from the Carpathian crest across the parallel ridges and the Galician plain. Among these transverse streams the Raba, Dunajec, Biala, Wisloka and Wislok have fairly open valleys throughout their middle and lower courses in the mountains, and have developed good meanders on the valley floors. The San is the most easterly of the important streams which enter the Vistula, and has an entrenched meandering course until it leaves the mountains at Przemyśl to turn abruptly northwest past Jarosław as a normal late mature river meandering extensively on a broad marshy flood-plain, slightly entrenched below the level of the Galician plain. To the southeast the remaining transverse streams flow in parallel lines to the Dniester, whose upper course meanders on a very broad flood-plain which is even more swampy than that of the lower San; while farther down the river is the deeply entrenched Dniester gorge. We should expect that the streams which debouch from the mountains would deposit some of their load of débris and thus tend to build up an alluvial piedmont slope inclining gently away from the mountain base. The topography suggests the presence of such an inclined alluvial plain; but it is evident that its formerly smooth surface has been much dissected by later entrenching of the stream courses, and the extent to which the older beds are masked by the alluvium is not clear. The Dniester and San appear to have had their courses determined by the intersection of this northeastward sloping piedmont plain with another southward or southwestward sloping plain described below.

The rocks which are strongly folded in the Carpathians suddenly flatten out toward the northeast and north to form the great plain of Galicia and Poland. The topography is not always that of perfectly horizontal rocks, however, but betrays the presence over broad areas of moderate dips toward the mountains. Thus in eastern Galicia there is a splendid *cuesta* with its gentle back slope inclined southward obliquely toward the range, while on the north the steep erosion scarp faces north or northeast toward a broad lowland eroded by the headwaters of the Bug and Stry Rivers. This *cuesta* is known as the Podolian Plateau, and the rivers flowing southward down the gentle back slope have cut deep gorges, which are remarkable for their straightness and their parallel arrangement. Toward Przemyśl the rocks of the Podolian Plateau appear to change to a southwestward dip, and the steep erosion escarpment bends abruptly toward the northwest. At the base of the escarpment, near the angle where the line of cliffs changes from a northeast-southwest to a southeast-northwest direction, lies the city of Lemberg, guarding a strategic gateway or low pass from the Bug lowland through the *cuesta* to the San-Dniester lowland and Przemyśl. Farther northwest, Rawaruska occupies a similar position. At both points strategic railways cross through the *cuesta* from one lowland to the other.

West of the San River the *cuesta* topography is less pronounced, but the plateau of southern Poland may represent its continuation, with a gentle slope toward the southeast and a poorly developed and very ragged escarpment facing northwest. If this is the case the upper Vistula would appear to flow along the depression formed by the intersection of the southeastward slope of the *cuesta* and the northward slope of the Carpathian piedmont plain, just as the San and Dniester Rivers flow in opposite directions along the depression of similar origin farther east. The surface of the south Poland *cuesta* or plateau is a

forested upland having an average elevation of nearly a thousand feet over broad areas, and dissected by deep stream gorges which make the country difficult to traverse. It is complicated by a broad uplift in the Kielec district which brings older rocks to the surface and forms the heights of Lysa Gora, which rise far above the general level.

North of the Podolian cuesta and its westward continuation in south Poland stretches the monotonously level plain of central and northern Poland and East Prussia. Here the strata of recent geological age lie horizontal, and the only topographic features of importance are the river valleys cut into the plain and the glacial deposits laid down upon its surface. As the plain surface is usually but 300 or 400 feet above the sea, the rivers cannot cut deep trenches; but they have widened their valley floors, and meander extensively over the broad flood-plains deposited during periods of high water. Floods result from heavy rains in the Carpathians or from ice dams along the lower courses of the streams. The principal river is the Vistula, which from the junction of the Upper Vistula and San flows in a broad shallow trench northwesterly through the Polish plain into Prussia, where it turns sharply northward to the Baltic. A majestic river of great volume, unfordable and seldom crossed by bridges, subject to terrible floods which may cover its entire valley bottom, it forms a serious obstacle to the enemy which would cross it; but a magnificent waterway, navigable for large vessels from the San to its mouth, for armies which are able to use it as a line of communication. Warsaw is located on a terrace 120 feet above the level of the stream, and therefore safe from damage by the floods.

The greater part of this plain has been glaciated, the ice sheet having reached nearly as far south as Lemberg. A mantle of glacial till covers much of the area, and has greatly disturbed the preglacial drainage. In the obstructed valleys, lakes and swamps are common, and vast areas of marsh characterize the undrained surface of the undulating till cover. In East Prussia a broad belt of terminal moraine forms the most important departure from the level plain topography. This morainic ridge, which reaches an altitude of 500 to 1,000 feet, trends southwest-northeast just north of the Polish border, and is noted for its intricate network of marshes and lakes, which culminate toward the east in the Mazurian lake district. Much of the country is wild, uncultivated areas of barren sand alternating with swamps and forest. Lyck, Allenstein, Tannenberg and Osterode lie within this belt.

*The Russian Plan of Campaign.* With the above-described elements of topography in mind, let us consider the general plan of the Russian campaign. One is tempted to measure the distance from the western border of Poland to Berlin and consider this as the distance Russian armies must move in order to threaten the German capital. This, however, is to ignore the absolute dependence of armies upon thoroughly safeguarded lines of communication. It would manifestly be impossible for a large Russian army to concentrate in western Poland and move on Berlin so long as an unbeaten German army occupied the morainic country of East Prussia, and a similar Austrian army existed in the rugged cuesta upland of Galicia; for as soon as the advance on Berlin was started, the lines of communication running from Russia through Poland to the army at the front would be in peril from a southward advance of the Germans debouching from the morainic hills, or a northward advance of the Austrians



descending from the cuesta upland. If either advance succeeded in severing, even for a short period, those arteries which alone enable an army in the field to live, disaster to the Russians would speedily follow. It would be more accurate, therefore, to draw a line from the eastern point of the Prussian border southeastward to the eastern border of Galicia, and consider this as the line from which the Russian advance on Berlin must be measured. This, roughly, doubles the length of the advance.

Already in possession of the territory immediately in front of the center of this line, the Russians had to concern themselves with the hostile territory at the north and south. On the north the task was the more serious. Here were combined the most highly perfected military machine and the most difficult topography. The complicated maze of lakes separated by narrow necks of land easily fortified, marshes crossed by few good roads, and therefore all but impassable for large bodies of invading troops, and forests through which invading armies must advance over occasional roads in long drawn-out columns peculiarly vulnerable to surprise attacks served to make a Russian invasion exceptionally difficult. In order to make an advance on Berlin from western Poland feasible, Russian armies must drive the Germans out of all that part of Prussia projecting east of the west Poland border. This would involve passing a very serious obstacle, the broad, shallow trench of the lower Vistula which cuts across the neck of the peninsula of eastern Prussia. The strength of this defensive line lies in the fact that the invaders would have to traverse the broad, flat floor of the valley under fire from artillery posted on the crest of the western valley wall, and would also have to cross an unfordable river of great breadth and volume; and in the further fact that each end of this line is guarded by a powerful fortress, Thorn at the south and Danzig at the north.

*East Prussian Campaign.* Into this morainic country of East Prussia the Russians launched a vigorous offensive in the first month of the war. Before the end of August, Russian armies had threaded their way through the forests, among the lakes and marshes, and over the rolling hills, always beating back the German defensive, until more than half the distance to the Vistula barrier had been traversed. Then two Russian army corps, caught in the mazes of the difficult region near Tannenberg by a successful German manœuvre, were practically annihilated. The difficulties of negotiating the morainic defensive line in the face of the Prussian military machine had proved too great, and the Russian line fell back.

The morainic topography continues across the East Prussian border into Russia, where, in the region of Suwalki, one finds a country of forested, marshy fenland and lakes, perhaps even more difficult to cross than the region farther west, especially since roads and railroads are less numerous. From Suwalki eastward to Sejny a narrow causeway through the marshy forest is the main highway of travel. As the Russians fell back the Germans followed them into this difficult region. It is interesting to note that the Germans were now confronted with almost exactly the same topographic features which had opposed the westward movement of the Russians. Not only was there a region of hills, forests, lakes and swamps to be crossed, but beyond lay the valley of a large river, the Niemen, which, like the Vistula, runs from south to north across the path of advance. To correspond with the fortresses of Thorn and Danzig at the two ends of the Vistula barrier stand the fortresses of Grodno and Kovno at the ends of the Niemen trench. This great topographic barrier is Russia's



main protection against an invasion from Prussia. Behind it the retreating Russian armies took their stand about September 25th. Against it the German armies dashed themselves in a vain endeavor to pass over to the eastern side. After a vigorous artillery duel the German offensive waned, the Russians retook the offensive, and there began that pursuit of the German column back through the marshes and forests to the westward which is known as the Battle of Augustowo. Hampered by the broad marshes and few roads, the Germans lost heavily, particularly, it is reported, along the narrow Suwalki causeway. By the first week of October the German line had been pushed back into Prussian territory at the south and nearly to the Prussian border on the north. The topographic barriers of the Suwalki province had in turn proved too difficult for the German armies. By a slow and painful advance the Russians were able to reach the line of the Angerapp River and eastern side of the larger Mazurian lakes by November 15th, which excellent defensive line they held for three months against German attacks, until the sudden arrival of new German forces in February compelled another Russian retreat to the defensive line of the Niemen.

*Galician Campaign.* Turning now to the southern campaign, let us see what influence topography exerted upon the course of events in Galicia. In several respects topography here favored the Russian plans. No topographic barrier along the boundaries between Russia and Galicia prevents an easy invasion of the latter, whereas the formidable barrier of the Carpathians does separate Galicia from the rest of Austria-Hungary. Galicia is, therefore, a peripheral province, which is for topographic reasons peculiarly isolated from the rest of its country and therefore more easily subject to conquest by a neighboring power. During the invasion the deep gorge of the lower Dniester, and farther west the marshy flood-plain of the upper Dniester, would serve as admirable protections for the left flank of the invading army. Once the Austrian armies were pushed westward toward Cracow or southward over the Carpathians, the few passes over the latter could be held by small detachments of troops, and the left flank of the westward-moving Russian army would then have the effective protection of a mountain barrier; for while several roads and railways cross through the passes, they are so readily controlled that the strategic importance of the barrier is not greatly diminished. Austrian reinforcements would have to defile through the passes and along the few narrow mountain roads in greatly extended columns, a formation which would render them vulnerable to attack by inferior numbers. No sudden assault of serious magnitude upon an army flank which is protected by a mountain barrier is feasible.

With these favorable topographic elements was combined the further favorable fact that the Austrian armies were less formidable than the Prussian military machine. Political conditions in Austria-Hungary also dictated a vigorous Russian offensive in Galicia, since a nation composed of heterogeneous elements, some of them held in subjection against their will, can be more easily driven to seek peace after military reverses than can a nation which is better unified. Topographic, military and political considerations combined, therefore, to induce the Russian General Staff to subordinate the East Prussian campaign to far greater movements in Galicia.

There were, however, some formidable topographic obstacles to be overcome by the advancing Russians. The first of these of major importance was

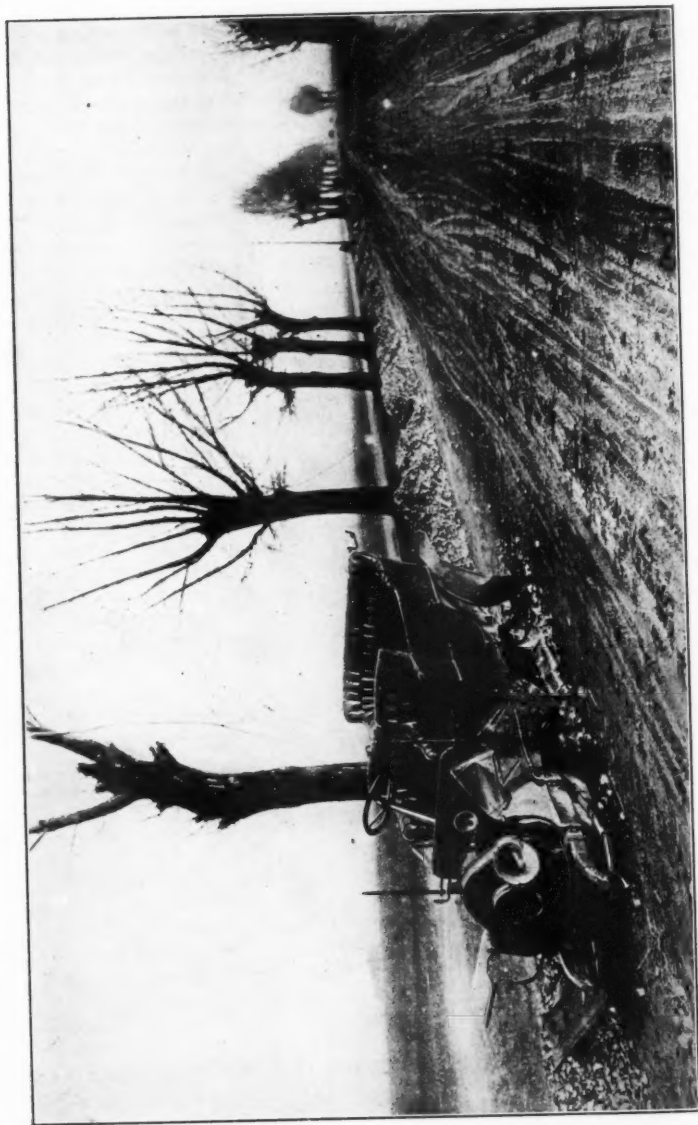


FIG. 2—Motor car destroyed by an aeroplane near Lodz. A typical view of the Polish plain. Photo by Paul Thompson.

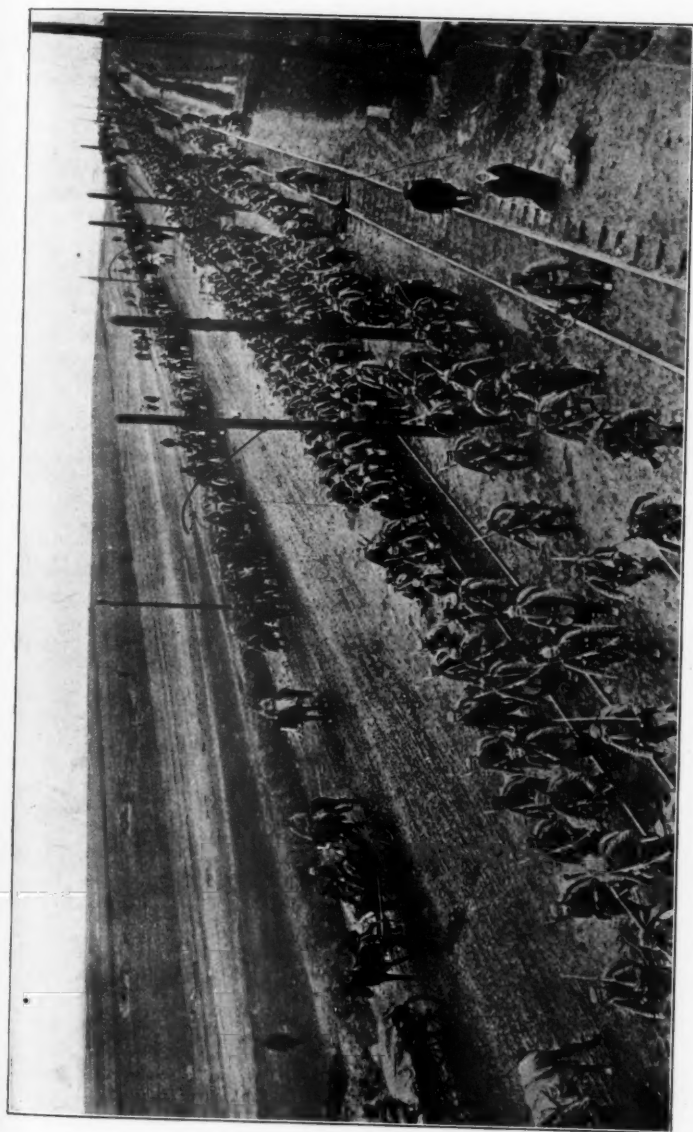


FIG. 3—German soldiers advancing toward Warsaw across the level surface of the plain of Poland. Photo by Paul Thompson.

the Bug River, which receives the waters of numerous tributaries heading against the steep inface of the Podolian cuesta and flows northwestward through the Bug Lowland to the Poland plain. Late in August, after a number of preliminary skirmishes, Russian armies invaded Galicia in force, driving back the Austrians to the valley of the Bug. The marshy flood-plains of this river, together with the meandering course and interlacing channels of the stream, afforded a good line of defense for the Austrians. The marshes were probably more formidable to the invader than was the channel of the river itself; for in negotiating them troops must "defile" along the few good roads, crossing the wet lands in long, narrow columns which offer a good mark to the defenders, but which prevent the moving army from developing more than a fraction of its fighting power. On account of the water it is impossible to entrench in a marsh, so that the attacking force cannot profit by the temporary shelter of trenches during a slow advance. For these reasons marshes are usually considered one of the most serious obstacles which an army can encounter. It was not surprising, in view of the topography, to hear of fierce fighting along the line of the Bug River and to read in the despatches repeated references to the few towns, such as Sokal and Kamionka, marking the points where important roads cross the wet valley floor.

After defeating the Austrians along the Bug, the Russians in their westward advance soon reached the barrier presented by the steep face of the Podolian cuesta where it trends from southeast to northwest. The situation was much like that encountered by the Crown Prince's army in France when it attacked the steep escarpment of the east-facing cuesta near Verdun. In places the Podolian cuesta scarp rises several hundred feet above the Bug lowland, and is often quite precipitous, especially where resistant limestones composed of old coral reefs weather into nearly vertical cliffs. In other places the escarpment is lower, but steep, and may present a nearly continuous wall for many miles at a stretch. Occasionally it slopes down more gradually to the plain as a forested hillside, while out in front are numerous erosion remnants in the form of mesas and buttes.

Whatever the local nature of the cuesta escarpment, it offers a serious obstacle to the troops which must cross the lowland toward it under fire of artillery posted on the crest, and then ascend the steep slope in face of the enemy's fire. We do not know just what was the disposition of the Austrian troops along this line; but we can hardly imagine that they failed to take advantage of the opportunities for defense offered by the cuesta topography. We do know that the great battles of Lemberg and Rawaruska were waged for the possession of the two strategic gateways through the cuesta, and that much of the fighting for Lemberg took place east of that city, probably along the face of the cuesta and the long foothill ridges which here extend many miles out into the lowland. That the Austrians did not hold this line longer was probably due in part to the fact that they had expected to fight the decisive battle farther north in Poland and had not kept sufficient troops in the southern district to cope with the unexpectedly large Russian army sent against them there; and probably also in considerable part to disorganization resulting from their defeat along the Bug.

An army advancing westward across the Bug lowland could not be wholly safe so long as its left flank was in danger of attack from Austrian forces operating in the rugged country on top of the cuesta to the south. It was

therefore part of the Russian plan to sweep the Podolian plateau, as the cuesta upland is called, free of hostile troops. For this purpose the Russian line was continued southward in sufficient strength to make it possible to cross the deep north-south gorges of the parallel rivers in the face of any Austrian forces likely to contest their passage. These gorges present a succession of serious obstacles to the progress of an invader, and were not passed without fierce fighting at some of the principal crossing points. The gorge of the Dniester served to protect the left flank of the line, and the principal fighting occurred to the north of that barrier.

Immediately west of Lemberg lies the fortified town of Grodek, standing in one of the north-south parallel valleys, here occupied by a string of lakes connected with each other by rivers. Along this barrier the Austrians succeeded in checking the Russian advance for a short time. The next important physical barrier west of the Lemberg district is the marshy lowland of the San and Upper Dniester Valleys. As already noted, this is one lowland formed by the intersection of the backslope of the Podolian cuesta and the piedmont slope in front of the Carpathian barrier. The northeast flowing San and southeast flowing Dniester make an almost continuous river barrier along the lowest line of the lowland. Both rivers meander extensively on broad, marshy flood-plains on which are countless abandoned meander channels and oxbow lakes. Along the San the meanders are larger than those of the Dniester, and the oxbow lakes and crescent shaped marshes are both larger and more numerous. Indeed, the lower San is characterized by a perfect network of these cutoff lakes and marshes, making passage across the flood-plain unusually difficult.

An obstacle like the marshy belt of the San-Dniester lowland, while a valuable line of defense for an army retreating in good order, becomes a serious menace to an army which has been badly beaten and is retreating in confusion before an energetic pursuer. Fleeing troops crowd in disorder toward the few passable roads leading over the marshy ground, and lose most of their fighting power as a consequence of the ensuing disorganization. After the battle of Lemberg the despatches repeatedly referred to the efforts of the Russians to drive the broken and defeated Austrian armies into the marshes to the west, where they could be overwhelmed with disaster. That these efforts were partially successful is indicated by the inability of the Austrians to hold the Russians in check along the San-Dniester line, and the evidently decreased fighting power of the Austrians during the immediately succeeding weeks. Przemyśl, the great fortress which stands near the gap between the marshes of the San and those of the Dniester, was soon invested, and the Russians pressed on to seize the passes across the Carpathians southwest of the fortress, thus securing their left flank from danger of sudden attack in the future.

The conquest of the San-Dniester lowland by the Russians is of geographical interest from two other standpoints. Although a barrier to an invader who would cross it, the lowland is one of the great routes of travel between central and southeastern Europe. The Carpathians on the southwest, and the vast marshes of the Pripet River across the Russian border to the northeast, restrict travel to the San-Dniester depression. Along its axis runs the main railroad connecting Bucharest and the Black Sea, via Czernowitz and Cracow, with Berlin and western Europe. The control of a natural highway continuing northwestward down the Oder to Berlin, is of no small value to the armies which have Berlin as their ultimate objective. Of more immediate importance is the

capture by the Russians of the oil fields on the southwest side of the lowland, especially near Drohobycz. From these fields came an appreciable part of the fuel used by the motor transport service of the German armies, and the loss of this source of supply must have been a serious blow to the Teutonic allies.

After passing the line of the San and Dniester, the Russians continued their westward advance toward Cracow. The topographic line of least resistance is here a subordinate lowland lying along the south side of the broader lowland already described, and just at the base of the Carpathian foothills. No one river flows through this minor depression, but parts of several rivers occupy it. Thus the lower Wislok follows it for twenty-five miles before joining the San, while large branches of the Wisloka flow eastward and westward through it to join the trunk stream. The main railroad already described takes advantage of it in passing from Przemyśl to Cracow. At its eastern end, just where the railroad enters the trench, stands the fortress of Jarosław; while at its western end, where it merges with the low land immediately along the Upper Vistula, is the great ring fortress of Cracow.

The capture of Jarosław about the end of the third week in September gave the Russians full command of the entrance to this subordinate lowland or trench. About September 23rd they reached the strategic point Rzeszów, where the Wislok debouches into the trench; and a few days later Debica, where the Wisloka similarly flows from its mountain valley out upon the trench floor. By the end of the first week in October the invaders were in the vicinity of Tarnów, still farther west where the Biala River enters the trench to unite with the larger Dunajec. Thus the strategic points of which we heard most frequently mark the junction of transverse mountain valleys with the subordinate lowland parallel to the mountain base. During this advance troops were also moving westward through the mountains just to the south. Here they encountered the obstacles formed by the fairly open flat-floored valleys of the rivers mentioned above. Along all of these valleys, which lie across the line of advance, the Austrians offered resistance to the invader's progress. Occasionally these valleys expand into fairly broad intermont basins on whose level floors stand towns of more than ordinary size and military importance. Among those most frequently mentioned in the war despatches are Krosno in a basin on the Wislok; Gorlice, Zmigrod and Jasło occupying the three corners of a triangular basin on the Wisloka; and New Sandek and Zakliczyn in separate basins on the Dunajec.

The subsequent retreat of the Russians from in front of Tarnów was not connected with any topographic obstacle in Galicia, nor indeed with any Austrian victory in this region. A German advance on Warsaw across the plain of Poland early in October made it necessary for the Russians to fall back at the south in order to keep their left wing in line with the retreating center. The retreat stopped at the admirable defensive line formed by the San River and its marshy flood-plain. Behind this barrier the Russians took up their position about October 11; and whereas the broken Austrian armies retreating from the Lemberg region earlier in the campaign had been unable to profit by the natural defensive line of the San, the Russians now held it successfully against the Austrian attacks. A few Austrian troops succeeded in crossing the river at isolated points; but they were never able to effect a crossing in force, and the Russians maintained their position until the defeat of the Germans before Warsaw and their consequent retreat enabled the Russians to resume their westward advance in Galicia. During this second advance the subsidiary lowland



from Jaroslaw to Cracow again exercised a controlling influence on the movements of the armies, while the transverse north-south valleys in the Carpathians provided a succession of defensive lines along which fierce battles were waged for a second time.

When the Germans began their second drive at Warsaw about the middle of November, the Russians had reached the environs of Cracow at the western end of the Galician lowland. As the Germans pushed eastward to the line of the Bzura, Rawka and Nida Rivers, the Russians in Galicia were again compelled to retreat. This time, however, they fell back a comparatively short distance, and took up a defensive position on the east bank of the lower Dunajec River soon after the middle of December. Aided by the natural protection which the river and its broad, flat valley afford, the Russians have now held this line for more than two months, notwithstanding vigorous efforts of Austro-German armies to dislodge them.

*The Campaign in Poland.* There remains for consideration the influence of topography upon the campaign in the Polish plain. We may note in the first place that the difficulty of transporting and supplying armies, which is such a marked characteristic of the campaigns in Poland, is itself in part a response to the physical conditions of the region. The long roads necessitated by the vast distances, while favored by the levelness of the surface, are of very inferior quality because the rocks underlying the plain do not supply a large amount of good road metal, and because the numerous marshes which the roads must traverse afforded exceedingly poor situations for road building. The construction of both roads and railroads is said to be discouraged by the excellence of the river transportation routes, which are navigable for large boats in summer and are available for sledge traffic when frozen over in winter. Cross-country movements are limited, therefore, to a few long railroad lines and a comparatively small number of roads which become almost impassable in bad weather.

As we should expect in so level a country, rivers and marshes are the topographic features which have exercised the most evident effect upon the battle plans of the contending forces. During the first two months of the war the necessity of pushing the campaigns in East Prussia and Galicia, for reasons already indicated, led the Russians to pay little attention to operations in Poland. Raiding armies advanced and retreated along the few railroads for distances of a hundred miles without attracting serious attention, in view of the more important operations to the north and south. One striking exception to this statement is the important Austrian invasion of the Lublin district at the beginning of the war, during which advance and the subsequent retreat the barrier of the Vistula between Ivangrod and the Galician border was utilized as a protection for the Austrian left flank.

From the beginning of October, when the Germans commenced their first drive at Warsaw, the influence of river valleys upon the distribution and movements of the troops becomes very noticeable. Threatened by the German advance, the Russians fell back to the best defensive line in all Poland, the valley of the Vistula. Once behind this barrier they could receive the shock of the German onslaught with greater confidence in the outcome, and could hold the enemy at bay until a proper concentration of forces would enable them to take the offensive. The Vistula in this part of its course is crossed by bridges at



but two points, Warsaw and Ivangrod. Near the Galician border it has a breadth of nearly a quarter of a mile, and at Warsaw of fully one-third of a mile. It is everywhere too deep to ford. Along its valley bottom are extensive belts of marsh, while from the crest of the plain above artillery could effectively shell troops endeavoring to cross the river and marshes.

It was behind such a barrier as this that the Russians took up their position about October 10. Only at Warsaw did they remain on the west bank, supported by the ring of fortresses which surround the Polish capital. From the Galician border the barrier is continued in the same straight line, as far as Przemyśl, by the San River; and we have already seen that the Russians in Galicia fell back to this line in order to keep in touch with the armies farther north. For 250 miles or more an almost unbroken line of Russian troops from near Warsaw to Przemyśl waited behind a great river barrier to receive the attack of the Austro-German forces. Never in history has so simple a topographic element been used for strategic purposes on so great a scale. Against this barrier some two million men hurled themselves in a determined effort to force a passage. Aside from the attempt to capture Warsaw, their greatest efforts appear to have been concentrated upon that part of the line near Josefow, where the Vistula is narrower than elsewhere, and the chances of effecting a crossing better. But all attempts to pierce the Russian line ended in failure, and the Russians launched a vigorous counter attack on the German left which soon bent that wing backward away from Warsaw until part of it was facing northward along the line of the Pilica River.

The continuation of this offensive compelled the Austro-German forces to retreat along the entire line. It was generally anticipated that the retreating armies would make their first stand at the Warta River, and attempt to utilize that topographic feature as effectively as the Russians had utilized the Vistula-San Valley, especially since it was reported that active work in fortifying this line had been going on for some weeks. But whether because the pursuit by the Russians was pushed too vigorously, or because the Teutonic allies preferred a line nearer their strategic railways just inside the Posen border, the Warta valley was crossed before the Russian pursuit was brought to a standstill, about the middle of November.

Immediately, there began the second German drive at Warsaw. During the German advance and Russian retreat a portion of the Warta valley was held for a time by the Russians to cover the retirement of their main force; but a more striking influence of topography on army movements may be seen by examining the battle line of November 17-19. At this time the line of contact between the two armies, after running northward through western Poland to Leczyca, turned due east toward Warsaw for 30 miles to Lowicz, whence it bent toward the north once more. The reason for this peculiar alignment is not far to seek. The Bzura River flows eastward from Leczyca to Lowicz in a shallow trench cut in the plain, and then turns gradually northward to the Vistula. Westward from Leczyca the trench continues, but is there occupied by a westward flowing branch of the Warta. For a distance of sixty miles the floor of this trench is practically one continuous belt of marsh, with one important causeway crossing it near Piontek, half-way between Leczyca and Lowicz; and another at Leczyca. Confronted by superior German forces advancing eastward from the Posen border, the Russians decided to fall back toward the south and take up a defensive position on the southern side of the marsh belt until

reinforcements could arrive. In this position they could also protect the city of Lodz, which lay a few miles farther south. For a short time they did succeed in holding the marshy barrier against the attacks of the enemy; but apparently the western part of the German line, already south of the marsh, forced the evacuation of Leczyga, while determined frontal attacks enabled the Germans to cross the causeway at Piontek. There followed that most remarkable confusion of the two lines, when the Germans who had broken through at Piontek nearly surrounded a portion of the Russian army at Lodz, and were in turn themselves surrounded by the Russians. When the lines were finally straightened out the Russians were gradually forced back until they took up a new defensive line running from north to south along the eastern banks of the lower Bzura, the Rawka, the Nida, and the lower Dunajec Rivers. Thus by the end of the third week in December the Russians were again lined up along a north-south barrier consisting of parts of several different rivers. This line they still held at the end of February.

During the second German advance toward Warsaw, which was stopped by the Russian defensive along the line just indicated, the Germans made excellent use of the lower Vistula, from the mouth of the Bzura to Thorn, as a protection for their left flank. Ever since the middle of December the Germans south of the lower Vistula have been far to the eastward of Russian troops posted on the northern bank. At times large Russian forces have advanced along the north bank well toward Thorn, and more than fifty miles west of the German front along the Bzura. This was possible because the great river, here bridged only at Plock and Wloclawek, made it almost impossible for the Russians to cross to the south side and attack the German flank. Small German forces at critical points on the south bank of such a barrier could insure the safety of lines of communication supplying armies along the Bzura front. On the other hand, the Germans have been largely denied the use of the Vistula itself as a line of communication, as attempts to bring supplies by boat from Thorn have been more than once thwarted by the activity of the Russian artillery posted on the northern bank of the river. In this connection it may be noted that the Germans in East Prussia have often operated far in advance of the rest of their line in Poland, because the east-west belt of difficult morainic country serves as a protection against sudden flank attacks from the south.

The important strategic rôle played by the rivers and marshes of the Polish plain could be traced much further if space permitted. Enough has been shown, however, to justify the conclusion that these two elements of Polish topography have been much utilized by both combatants. In conclusion, it may be pointed out that after the failure of the dash to Paris the Germans probably hoped to take possession of the line of the Niemen-Narew-Vistula-San before the beginning of winter. They could then entrench themselves along this continuous marsh and river barrier, holding the Russians at bay with as small a force as practicable and freeing the largest possible number of troops for a renewed offensive in the west. Such a line could have been readily defended because of its physical character, and would have had the added advantage of lying mainly on Russian soil and including within its limits the captured Polish capital. The project failed because the Russians themselves made effective use of this same line of barriers in their operations against the Germans, and were ultimately able to take and hold positions along another line farther west.

## KOCH'S OBSERVATIONS ON GREENLAND'S ICE-CAP\*

The broad outlines of the story of Koch and Wegener's crossing of Greenland have already been given (*Bull.*, Vol. 45, 1913, pp. 852 and 938). The experiences of the party as regards the glaciology and the atmospheric conditions largely confirm what is already known from the experiences of Nansen, Peary and de Quervain, while adding much that is new. Over the flat dome of the ice shield an area of atmospheric calm was traversed with much mist, which in the morning was so dense as to hide the sun. The air was so supersaturated with moisture that the clothing was almost constantly wet and could be dried occasionally only with great difficulty. When, at noonday, the sun had penetrated the mist in the thin air (barometer at 500 mm.), the ultra-violet rays were so little absorbed as to burn the face and cause painful blisters on nose, cheeks and lips, and these sores were much aggravated by the subsequent cold. In contrast with the central area of calm and supersaturated air, the marginal portions of the glacier were subject to continual storms, with wind descending the slopes and filling the air with drift-snow—likewise the prevailing characteristics of the fixed glacial anticyclone. An average advance of 9.3 miles per day was made. As the party advanced, the force of the wind diminished until the central area of calms was reached. Here the expedition encountered a great surprise, for the track of a fox was discovered almost in the middle of the journey. He may have followed the party from the margin of the continent, as did the snow sparrows.

As the party approached the western coast it encountered the same heavy, deep snow slush, the same sharp, jagged ice and the turbulent streams of thaw water which had been met with by the earlier expeditions, and which we know to be due to the fine rock dust that is carried inward where the migrating cyclonic movements of the atmosphere invade for short distances the margin of the fixed anticyclone.

The maximum altitude reached was about 10,000 feet, which, as was to be expected, is somewhat higher than that reached upon the shorter sections of earlier explorers, but which, unlike them, is to be found to the westward of the medial line.

During the winter in the hut upon the inland-ice modern methods of temperature study within the ice were applied through the sinking of bore-holes. These holes were carried to a depth of twenty-six feet outside the hut and to as much as seventy-eight feet from a point within it. The observations were carried out daily throughout the winter and showed that at depths where the ice temperature remains constant throughout the year it varies but little from the average air temperature of the locality, in this case  $-15^{\circ}$  C. Passing to greater depths, a slight but measurable augmentation of temperature of  $1^{\circ}$  C. per sixty-five feet of depth was established. Above an elevation of 6,550 feet,

\* Unsere Durchquerung Grönlands 1912-1913. Von J. P. Koch. Maps. *Zeitschr. Gesell. für Erdk. zu Berlin*, 1914, No. 1, pp. 34-50.

Vorläufiger Bericht über die wissenschaftlichen Ergebnisse der Expedition. Von Alfred Wegener. *Ibid.*, pp. 50-54.

which was found quite near the coast on both margins, all evidences of summer melting disappear, and the structural changes of the snow are entirely explained through sublimation. On top, there always lay a stratum of finely granular snow, which met a subjacent layer of coarse-grained material in a somewhat sharp boundary. In the marginal portions it was established that the finely granular layer corresponded to the winter precipitation; and since the thickness of this layer was measured throughout the journey, a good approximation as to the amount and the distribution of the annual precipitation over the inland-ice was arrived at. The thickness of this layer decreased from about eighteen inches near the east coast to about twelve inches in the interior, and then increased to about 3.3 feet as the west coast was approached. When near the center of the journey, during two days of rest, holes were carried down to a depth of from twenty to twenty-three feet, and a temperature of  $-32^{\circ}$  C. was obtained, which was believed to correspond closely to the average air temperature of the locality ( $-15^{\circ}$  C. at winter quarters on Storströmman glacier outlet).

The winter station of "Borg" was the first in connection with Arctic exploration to be located upon the inland-ice, although near its margin. The temperature observations are thus of particular interest in showing that the average winter temperature is about  $5^{\circ}$  C. lower than at Danmarkshavn on the outer coast, where the Denmark expedition wintered in 1906-08. If Wegener is correct in taking the average air temperature from that in the deep borings in the ice, this value is of interest in showing the gradation toward  $-32^{\circ}$  C. which he derived for the interior of the continent. The precipitation at Borg was also found to be considerably less than on the coast, which is in conformity with the idea of nourishment of the continental glacier from other sources than the rising surface currents of air derived from the margins. On reaching the west coast a visit was made to the Jakobshavn glacier outlet, and the fact was established that this ice stream has retired several miles since it was last visited.

WILLIAM HERBERT HOBBS.

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## THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

There has been a growing feeling among teachers that there should be an organization devoted to advancing the teaching of geography, *i. e.*, an organization devoted to the study of educational problems. As a result of discussion at the St. Paul meeting of the National Education Association last summer, and of extensive correspondence, the desirability of forming such an association, together with a general plan of organization, was presented to the Association of American Geographers at the Chicago meeting in December, and met with its hearty approval. President Brigham appointed Richard E. Dodge, Teachers College, R. H. Whitbeck, University of Wisconsin, and Charles R. Dryer, Fort Wayne, as a committee to cooperate with others in the formation of the new organization. This committee was enlarged to include Charles C. Colby, Peabody College for Teachers, Nashville, Tenn., L. O. Packard, Boston Normal School, Boston, Mass., and George J. Miller, State Normal School, Mankato,

Minn., and was organized with Mr. Miller as Chairman and Mr. Packard as Secretary.

The first meeting of the committee was held in Chicago at the close of the meeting of the Association of American Geographers and the general plan of organization was outlined. It is proposed that representatives from each state form the National Council of Geography Teachers within which there shall be an executive committee; that the representatives from each state be expected to form a state council (or cooperate with an existing society), composed of the leaders of geography in their respective states. The chief purpose of the state council shall be to promote better geography teaching in every way possible, working through existing teachers' associations, state, district, county, etc. It is not expected that the teachers of geography in a single state will necessarily hold separate meetings, but it is intended that they will meet in connection with existing organizations, and have programmes devoted to geography. Other purposes are to get speakers on geography for the programmes of all teachers' associations, thereby directing attention to and awakening interest in the subject; to assist school officials in organizing geography in the elementary and high schools in accord with the modern conception of the subject; to encourage the preparation of papers on geography teaching for local and national journals; and to assist individual teachers in selection of material, arranging subject matter and courses of study, etc. Experience will suggest many other ways of advancing the work.

The committee deemed it inadvisable to attempt, at present, the holding of national meetings. It is proposed that such meetings be held at opportune times in affiliation with existing national organizations such as the National Education Association, Association of American Geographers, the American Association for the Advancement of Science, etc. The National Council of Geography Teachers will then be in a position to undertake the solution of the larger problems of educational geography, such as how to secure better appreciation of the importance of geography in normal schools, where the subject receives little or no attention at present; how to secure better trained teachers of geography in normal and secondary schools; organization of the essentials of geography as a guide to school officials; cooperation with school officials in establishing geography teaching on a more effective basis.

The committee have already received the hearty support of many leaders of geography teaching. Some of these men and women are now active in establishing an organization in their state. It is hoped that there will be an effective working organization in nearly every state inside of two years. The committee believe that the greatest immediate good will be accomplished by active state organizations. The Chairman will appreciate any suggestions concerning the welfare of the National Council of Geography Teachers; receiving the names of geographers who are willing to cooperate in the movement; suggestive methods of increasing an interest in geography teaching; and suggestive methods of financing the small but necessary expense of correspondence.

## GEOGRAPHICAL RECORD

### THE AMERICAN GEOGRAPHICAL SOCIETY

**Meetings of the Society.** A meeting of the Society was held at the Engineering Societies' hall, No. 29 West 39th Street, on Tuesday evening, Feb. 23, at 8.30 o'clock. Vice-President Greenough in the Chair.

The following persons recommended by the Council were elected Fellows:

L. Philip Denoyer, Chicago,  
Andrew Arthur Benton, New York City,  
Lieut. John C. Soley, New Orleans, La.,  
Ralph Emerson Twitchell, Santa Fé, N. M.,  
Edward H. Swan, New York City.

Mr. B. R. Baumgardt, member of the Southern California Academy of Sciences, addressed the Society on "Berlin and Modern Germany." The lecture was illustrated by lantern views.

On Tuesday evening, March 9, an extra inter-monthly meeting was held at the Engineering Societies' hall at which Mr. Glen Arnold Grove addressed the Society on "Holland" with lantern illustrations.

**Presentation of the Cullum Geographical Medal to Dr. J. Scott Keltie.** At the meeting of the Royal Geographical Society on Feb. 22, 1915, the Cullum Geographical Medal was presented to J. Scott Keltie, LL.D., Secretary of the Royal Geographical Society, London, by United States Ambassador Page, in behalf of the American Geographical Society of New York.

In opening the meeting, Mr. Douglas W. Freshfield, President of the Royal Geographical Society, said:

"Before we come to the ordinary business of the evening, we have a very pleasing ceremony to witness. The American Geographical Society of New York have been good enough to recognize the great services that have been rendered to geography by our Secretary, Dr. Keltie, during his long term of office here, by according him the Cullum Geographical Medal, which, I believe, is presented only to most distinguished geographers. In addition to that, His Excellency, the American Ambassador, has been good enough to come here to-night at the request of the American Geographical Society of New York to present the medal to Dr. Keltie. I will ask His Excellency to do so."

The American Ambassador, addressing Dr. Keltie, said: "I have laid upon me, by the American Geographical Society of New York, the very agreeable and very honorable duty of presenting to you, sir, this their medal. It is presented to you in recognition of your long and eminent service as Secretary of this Society and I need not say that it comes with the greeting of the American Society to this Society. It is the more agreeable duty to me to deliver this medal this evening because it happens to be the evening of the anniversary of the birth of Washington, which gives to all Americans a patriotic interest in the day, as well, of course, as the beginning of another century of peace between our two peoples. I have great pleasure in presenting this medal."

Dr. Scott Keltie replied: "Your Excellency: I beg you to convey to the Council of the American Geographical Society my deep appreciation of the honor they have done me in awarding me the Cullum Gold Medal, an honor enhanced, I venture to think, by its being presented through the Ambassador of a great nation, the spirit of whose culture, notwithstanding the infusion of many other racial types, is essentially Anglo-Saxon. I am sensible of the



value of the honor. It is, I believe, not awarded every year, and among the seven previous recipients are such distinguished names as those of Scott, Nansen, Peary, Amundsen, and Shackleton. I ought to feel proud at being allotted a place in such distinguished company. Moreover, I cannot but be gratified that so competent a body as the Council of the leading geographical society of the New World should adopt this method of expressing their conviction that during the last thirty years my efforts to promote the objects of this great Society, and to improve the position of geography in England, have achieved a certain measure of success."

**The Society's Exhibitions.** The attendance in February was 3,696 persons, an average of 132 a day. The collection of maps illustrating the war receives undiminished attention. The large collection of photographs showing many aspects of the scenery and development of Alaska will remain on exhibition till early in April.

**The Society's Educational Collection.** This collection of selected European school wall maps, atlases, and text books which for several years past has been shown in many of the Universities, and normal schools, from the Atlantic to the Pacific has recently been exhibited to many teachers in the middle west as follows: Feb. 2-12, Moorhead Normal School and Minnesota Teachers' Association of northwestern district; Feb. 12-26, Mankato Normal School and Southern Minnesota Teachers' Association; Feb. 26-March 13, Dept. of Geography, University of Minnesota. Special arrangements were made to bring in the teachers of Minneapolis and St. Paul. Care Prof. C. J. Posey; March 13-27, St. Cloud Normal School and Central Minnesota Educational Association. Care Miss Clara L. Stiles. Later dates are: March 27-Apr. 21, St. Paul Normal School, care of Pres. L. L. Everly; April 16-May 7, State Normal School, Kalamazoo, Mich. Care Prof. L. H. Wood; May 7-21, State Normal College, Miami University, Oxford, Ohio. Care Prof. Geo. W. Hoke.

**Joint Meeting of the Association of American Geographers and the American Geographical Society.** This meeting will take place at the house of the American Geographical Society in this city on Friday and Saturday, April 9 and 10, 1915. It is expected that the occasion will be of much scientific and social interest. The visiting members will have quarters at the Park Avenue Hotel, where there will be an informal social gathering in Secretary Bowman's room on Thursday evening. The attendance is likely to be even larger than last year. The sessions in the Society's building will be held in the rear exhibition room on the first floor.

#### NORTH AMERICA

**Advancing the Standards of Geographical Education.** The Association of American Geographers, as the *Bulletin* announced in February, at its meeting in Chicago on December 29 and 30 last appointed a committee to investigate the conditions of geographical education in our country; also to study the question how our educational standards may be advanced so as to meet the geographical needs of our people. A committee consisting of Richard E. Dodge, professor of geography in Teachers College, Columbia University; Ray H. Whitbeck, associate professor of geography and physiography in the University of Wisconsin, and Cyrus C. Adams of the American Geographical Society, Chairman, was later appointed to conduct the investigation.

The committee's report will be presented to the Association at the next annual meeting and one of the sessions will be entirely devoted to it. It is desired that the report shall embrace all phases of the subject—and among them the evolution of geographical education in Europe brought about by the impelling need for sound geography as the basis of countless activities and as essential in text-books, literature and maps.



This movement is based upon the conviction of our geographers that, on the whole, our vast school population is not as yet being prepared to possess and to enjoy all those conveniences of knowledge and those elements of culture which geography can give. The fact that as a people we have neglected the geographical phase of our education explains the great geographical deficiencies of many of our periodicals, encyclopedias, atlases and other publications. Our geographers themselves must be the primary agents in improving and perfecting present conditions. They have every encouragement to take up the work. Their efforts will evolve helpfulness in others; and they see before them the transformation in geographical education that has come to pass within the past thirty years in the United Kingdom, whose geographers and geographical societies now have, as the fruit of their labors, geography in the universities, a vast improvement in text-books and in methodology, map-making that nearly rivals the best products of the Continent, and an output of geographical literature, embracing all the content of geography, that would honor any nation.

**Association of American Geographers.** The Association, at its December meeting, accepted with regret the resignation of Prof. R. E. Dodge as editor of the *Annals* of the Association. Prof. H. H. Barrows was appointed to the editorship. William Libbey, R. DeC. Ward and A. H. Brooks were elected Councillors.

**Plans for Shore Protection.** The New Jersey Harbor Commission has made a report to the Governor of the state urging an appropriation of \$35,000 for the purposes of a complete investigation of the factors involved in seashore protection. This action was doubtless stimulated by the great damage done along the New Jersey coast during the past two years by storm waves. A report on the damage inflicted by storms in the winter of 1913-14, prepared by Professor D. W. Johnson and W. S. Smith, forms part of the last Annual Report of the State Geologist of New Jersey.

**Government Books on Geography and Exploration.** The government has recently published Price List 35, second edition, which gives the titles and many summaries of contents of all the books on geography, travel and exploration issued by the various departments and bureaus in Washington. Our government is one of the largest publishers in the world of works that should be in the libraries of all geographers. They are sold at moderate prices by the Superintendent of Documents, Washington, D. C., who sends the price lists free to those who ask for them.

**Physiographic Excursion in the Western United States.** In connection with the geographical work of the Columbia University Summer Session, Professor D. W. Johnson will conduct a physiographic excursion in the western United States next summer. The party will visit the Devil's Tower, Yellowstone National Park, Glacier National Park, Crater Lake, the Yosemite Valley, Royal Gorge of the Arkansas, and the Colorado Springs and Pikes Peak region. It is probable that the new Lassen Peak volcano and the neighboring recent cinder cone will be visited, as well as the Lake Bonneville shorelines and recent fault scarps near Bingham and Provo. While in San Francisco the party will participate in the excursions of the Geological Society of America to the San Andreas earthquake rift near Point Reyes Station, and the uplifted marine terraces at Santa Cruz. Two field courses will be given: a general course on the elements of physical geography and an advanced course on the physiography of the western United States. The courses are open to students and teachers of geology and geography. It is expected that the party will leave New York about July and be gone two months. Full information regarding itinerary, expenses, and academic credit may be obtained by addressing Professor D. W. Johnson, Columbia University, New York City.

**The Carnegie Starts on her Fourth Cruise.** The non-magnetic yacht *Carnegie*, on March 6, started on her fourth cruise. It is to continue for two years and the vessel's chief ports of call will be Colon, Panama, Honolulu, Dutch Harbor and Port Lyttleton (New Zealand). From the latter port a

circuit of the earth will be attempted (November, 1915-March, 1916) between the parallels of about 60° and 65° S. where but few magnetic data have been obtained since the expeditions of the *Erebus*, *Terror* and *Pagoda*, 1839-1844. In addition to the magnetic observations the work in atmospheric electricity is to receive special attention. The vessel is commanded by J. P. Ault, the other members of the scientific party being Dr. H. M. W. Edmonds (second in command) and Observers Johnston, Luke and Sawyer; also Dr. S. J. Mauchly as far as Panama.

**Opening New Farm Lands in British Columbia.** A large amount of land has been opened to settlement along the line of the Grand Trunk Pacific R.R. in British Columbia. In 1914, 1,963 land preemptions were taken up by settlers. The Canadian government announces that there are now about 1,500,000 acres of surveyed lands along this recently completed transcontinental route. Settlers are taking up tracts of 160 acres each on payment of a fee of \$2.

### ASIA

**Discharge and Sediment of the Yangtze-kiang.** In a communication to the *Zeitschrift der Deutschen Geologischen Gesellschaft* (B: Monatsberichte, Vol. 66, 1914, No. 6-7, pp. 325-328) Professor K. Keilhack of the Berlin School of Mines gives interesting data, based on personal observations made in September, 1913, on the volume of water and the sediment carried by the Yangtze-kiang, a subject about which we have surprisingly little information, he says, when the size and importance of the river is considered.

At the time of his visit the river was in flood and had reached a stage only one meter below the highest ever recorded. At its mouth, near Wusung, its depth was 12-14 meters (39-46 ft.); at Nanking, 250 miles above, 40 meters (131 ft.); and at Hankow, 685 miles above its mouth, 100 meters (328 ft.). From these figures and those for the width and velocity communicated to him by a pilot of twenty years' experience on the river, he estimates its discharge below Hankow when in flood to be 100,000 cubic meters (3,500,000 cubic feet) per second or, allowing for a high water period of four to five months, 50,000 cubic meters (1,750,000 cubic feet) per second as the annual mean. What this enormous amount of water means may be comprehended by remembering that the water requirement of Greater Berlin, with its 3,000,000 inhabitants, is 3.5 cubic meters (124 cubic feet) per second, or, in other words, the Yangtze-kiang could furnish the city's annual consumption in thirty-six minutes.

Based on filtration experiments carried out at the mouth near Wusung and on the above figures for discharge, Professor Keilhack estimates the weight of the amount of sediment carried during high water to be 34,000 kilograms (75,000 pounds) per second, or, on an average throughout the year, 17,000 kilograms (37,500 pounds) per second. This would be equal to a total annual load of 530,000,000,000 kilograms (584,000,000 tons). Assuming the specific gravity to be 2.2, this would amount to 240,000,000 cubic meters (8,480,000,000 cubic feet), or enough to cover an area of about 300 square miles—slightly less than the surface of Greater New York—with one foot of soil annually.

**The Occupation of Basra.** The capture of Basra or Busra, the chief port of Bagdad, by an Indian force, was announced some time ago in the daily press, and is an event of some importance. The *Journal of the Royal Society of Arts* for January 1 gives some notes in regard to the port. It is expected that it will form the terminus of the Bagdad railway, and perhaps also the eastern objective of the proposed trans-Arabian railway from Port Said to the Persian Gulf. The town is unhealthy, but the neighboring country is fertile, producing wheat, rice, dates, barley, much fruit, notably apricots, apples, figs, olives, pomegranates, and grapes, also vegetables, while roses are cultivated for attar. The trade in petroleum, to which considerable importance is attached, dates only from the beginning of 1914. The imports are considerable, German returns giving them as close upon £2,000,000 (for Basra and Bagdad) for the year 1913, as compared with about half that sum in the previous year. (*Scott. Geogr. Mag.*, Vol. 31, 1915, No. 2, p. 97.)

## AUSTRALASIA AND OCEANIA

**The Outbreak of Mauna Loa, 1914.** Dr. T. A. Jaggar, Jr., Director of the Hawaiian Volcano Observatory, has written an account of the renewal of activity last year in this volcano.<sup>1</sup>

Dr. Jaggar wrote in the *Report* of the Observatory for 1912 that, according to precedence since 1868, renewed activity in Mauna Loa might be expected before Feb. 1, 1915, as outbreaks are to be looked for at intervals of five years. The lava fountains appeared in the summit crater on Nov. 25, 1914, about 3.45 P. M. The four seismographs in the Observatory recorded 56 earthquakes in the three weeks preceding the outbreak. They attracted no attention except instrumentally. Kilauea did not show the slightest instantaneous sympathy with the Mauna Loa revival. If the lava of Kilauea should disappear in 1915 and remain dormant during the active epoch of Mauna Loa, a sympathy of alternation between the two volcanoes may well be suspected.

The Observatory was enveloped in mist on the afternoon of Nov. 25, but at Pahala on the south flank of Mauna Loa the summit was clearly seen. A column of white vapor suddenly rose from the north side of the summit and four others rose in rapid succession next south of it. There was no noise and no earthquake. The slender vapor stems over Mauna Loa reflected bright yellow light from what must have been immense fountains of lava below and they made collectively a wide trunk for a spreading mushroom of vapor above.

"This first night was unquestionably the most brilliant and up to the present (Dec. 7) represented the maximum fountain activity."

Messrs. Leslie Forrest and L. C. Palmer spent the night of Nov. 27 on the edge of the Mokuaweoweo crater basin and watched the fountains. The activity was confined to the main central basin, where an elongate area of new lava overspread the middle part of the floor. There were eight main fountains mostly playing continuously up to heights of between 300 and 400 feet. The other fountains were only 40 to 50 feet high. Mr. Palmer made a sketch map of this crater basin showing the distribution of the fountains and the area covered by the new lava.

Cablegrams have later reported large overflows of lava from the crater basin.

**Glacial Origin of Fiords of the South Island of New Zealand.**

During a visit to New Zealand in May, 1914, my attention was called by Mr. P. G. Morgan, Director of the New Zealand Geological Survey, to the following early recognition of the glacial origin of the fiords or "sounds" of the South Island, including a brief mention of what are now called hanging valleys, as well as the adoption of the self-destructive process by which the end of the glacial period was brought about, a process which Tyndall also advocated, for a time at least:

"The sea in fact now occupies a chasm [Milford Sound] that was in past ages plowed by an immense glacier, and it is through the natural progress of events, by which the mountain mass has been reduced in altitude, that the ice stream has been replaced by the waters of the ocean. The evidence of this change may be seen at a glance. The lateral valleys join the main one at various elevations, but are all sharply cut off by the precipitous wall of the sound, the erosion of which was no doubt continued by a great central glacier long after the subordinate and tributary glaciers had ceased to exist. The precipices exhibit the marks of ice action with great distinctness, and descend quite abruptly to a depth of 800 to 1,200 feet below the water level."

This statement was published in a report on a "Geological Expedition to the West Coast of Otago, New Zealand," in the *Otago Provincial Government Gazette*, Vol. VI, No. 274, p. 460, 1863.

W. M. DAVIS.

## EUROPE

**The Earthquake in Italy.** According to the latest information, the loss of life caused by the extraordinarily destructive earthquake in Central

<sup>1</sup>The Outbreak of Mauna Loa, Hawaii, 1914. *Amer. Journ. of Sci.*, Vol. 32, 1915, Feb., pp. 167-172.

Italy on Jan. 13 was due more to the faulty construction of the houses in the region affected than to the severity of the shock. The central region of the earthquake appears to have been close to the town of Avezzano, where about 90 per cent. of the total population, 11,000, were killed. Buildings were damaged across the peninsula from Rome on the west to Chieti on the east, towns 110 miles apart. The shock was recorded at many seismograph stations in various parts of the world, including that of Washington. It has often been said that the terrible mortality that accompanies these afflictions in Italy and in Latin American countries is due very largely to poor masonry.

**The War and Geography.** Baron Hulot, Secretary General of the Paris Geographical Society, in an address to the members on November 27, said that at the outbreak of the war two-thirds of the Society's working staff, as well as the president, treasurer and nine members of its Central Commission (corresponding to the Council in our Society) took service under the flag. The Society's building was soon after placed at the service of Countess Røderer, who filled it with the wives and children of soldiers who had gone to the war, the women being those who could not accept regular employment because their babies needed them. The Society issued the July number of *La Géographie* and the closing number of the year is the August-December number, so that the volume for 1914 is just two-thirds as large as usual.

Prof. Dr. Friedrich Biddingmaier was killed in battle before Verdun on September 23, aged 39 years. His special work was in geophysics and terrestrial magnetism at the Observatory of the University of Munich. He discussed the scientific results of the German South Polar Expeditions in Vols. 5 and 6 of its *Report*. He wrote in 1912, after he had been called to Munich as Custodian of the Observatory and Privat Dozent in the University: "I hope at last to have rest and an opportunity to devote myself wholly to science and my educational work."

The staff of field surveyors and assistants in the service of Prussia is large as the state carries on cadastral surveys as well as those of much less detail. The *Zeitschrift für Vermessungswesen* (Vol. 43, No. 27) says that 666 of these men had been called to the war and that, up to the time of publication, twenty-six of them had been killed and twenty-two wounded.

Prof. F. Machatschek of the University of Budapest, whose arrest by the Russians while he was making geomorphological studies in Russian Turkestan and his detention at Tashkent were reported in the *Bulletin* (January, 1915, p. 46), was later released and has been able to return to Vienna. He says he was well treated by the Russians.

Prof. Dr. Albrecht Penck, who for months was held a prisoner of war in London, has been released and has returned to Germany. He was attending the meeting of the Association for the Advancement of Science in Australia at the outbreak of the war and was not permitted to return home. (*Deutsche Rundschau für Geogr.*, Vol. 37, 1914-15, No. 5, p. 238.)

## POLAR

### ANTARCTIC

**Latest from Sir Ernest Shackleton.** The *Daily Chronicle* of London prints letters and a diary from Sir Ernest Shackleton which give some information supplementary to that printed in the *Bulletin* (January, p. 52). Sir Ernest wrote that, after wintering at the station he expected to plant on the coasts discovered by the Filchner Expedition to the south of Weddell Sea, he hoped to start at the beginning of November next for his sledge journey over the Antarctic Continent to the Pole and thence to Ross Sound. His party carried out an interesting and useful piece of scientific work in South Georgia, where true meridian posts were erected which would enable whaling and other ships to test their compasses. The expedition received an addition to its personnel, most unusual for a Polar expedition, in the shape of a stowaway.

**Names of the South Polar Plateau.** The question has been asked what name should be given to the high plateau surrounding the South Pole. Shackleton found the south central plateau on his line of march towards the Pole, roughly along  $170^{\circ}$  E. Long. He named it King Edward VII Plateau. Amundsen found the south central plateau on his line of march to the Pole roughly along  $160^{\circ}$  W. Long. He named it King Haakon VII Plateau.

Usage as to the names proposed for this plateau is not likely to be uniform till some authority such as an International Geographic Congress passes upon the matter. The sixth edition of Andreess Grosser Handatlas, sheet 6-7, indicates, in color, King Haakon VII Plateau around the Pole and stringing widely off to the north along Amundsen's line of advance. It also shows, in color, King Edward VII Plateau from the head of Beardmore Glacier, where Shackleton first saw the plateau, to and a little beyond his most southerly point of advance.

**Justice to Lieut. Wilkes.** *Science* (March 5) prints a review of Sir Douglas Mawson's book "The Home of the Blizzard" from the pen of Major General A. W. Greely in which the writer says: "It is pleasing to find Sir Douglas Mawson in that restricted class that has a due sense of obligation to predecessors. After praising the skill and daring of Wilkes in the hazardous voyage of his squadron for forty-two days along the borders of the antarctic circle, he adds:

'It is wonderful how much was achieved. We may amply testify that Wilkes did more than open the field for future expeditions.'

"Americans thus owe a debt to Mawson, whose faith, courage, and ability have given definite form to the 1,500 miles of the continent of Antarctica, which was reported by Wilkes only to be contemned and suppressed in narratives and on charts, and to be absolutely neglected by explorers for seventy years."

#### ARCTIC

**Captain Sverdrup on the Asian Arctic Coast.** It was noted in the *Bulletin* (January, p. 54) that the vessels *Hertha* and *Eclipse* had been sent out to succor the Russian expeditions under Lieut. Brussiloff and survivors of the ill-fated party in Franz Josef Land commanded by Captain Sedoff. The *Hertha* found records in Franz Josef Land concerning the fate of the Sedoff Expedition and then returned home. Captain Sverdrup was in command of the *Eclipse* with especial instructions to look for the Brussiloff party which left St. Petersburg in July, 1912, for the Arctic. *Nature* publishes (No. 2,361, p. 596) the report that, in September, Sverdrup himself was in difficulties, the ship being ashore near the mouth of the Obi. He was fortunately encountered by another vessel and the *Eclipse* was pulled off and proceeded. It is now announced from Russia that the *Eclipse* is in winter quarters in lat.  $74^{\circ}45'$  N., long.  $92^{\circ}$  E., a position that is well inland in the Taimyr Peninsula, so that it may perhaps be inferred that she has found a berth in a bay on that coast. It does not appear that her search has yet been successful.

**Mr. Leffingwell's Work in Alaska.** For some years Mr. Ernest de K. Leffingwell has been engaged in scientific work along the north coast of Alaska. When he and Mikkelsen went to that coast in 1906 he found that the charts of the coast were practically the same as those made by British explorers three-quarters of a century earlier. He found also that the interior was almost unknown. Since then he has mapped about 150 miles of the coast, including many islands, on a large scale. He has made about 1,000 soundings in the shoaler waters along the coast. Inland he has mapped the broader geographical and geological features in an area about eighty miles square. As a support for the maps he triangulated 100 miles of the coast with a creditable degree of accuracy and the remainder somewhat more roughly. In order to locate and orient the map he took astronomical observations for latitude, longitude and azimuth. He is at present at the U. S. Geological Survey in Washington and hopes to complete his work for publication before summer. It is not likely that he will return to Alaska.

## GENERAL

**Summaries of Geographical Articles in English, German or French.** The growing tendency of geographical and geological bureaus, whose reports are printed in languages not widely known, to issue summaries or full details of these reports in English, German or French, is heartily to be commended. Probably no colonial power has been more active in the scientific study of its oversea possessions than the Dutch since they began the work of developing the Dutch East Indies. Many hundreds (a French writer recently said over 2,000) resulting papers, monographs and books are on library shelves all over the world, but this great wealth of material is available only for those specialists and students who are able to read Dutch. It is pleasant to turn to the official publications of some other countries, Denmark, for example, whose scientific literature is likely to be paraphrased in one of the three most generally known languages so that they may be useful to students in all countries. Most of the contents of *Meddelelser om Grønland*, which contains the largest series of monographs and papers published on Greenland, is in this way made available to everyone interested. At the present time some American students may feel indebted to *Danmarks geologiske Undersøgelse* (II Raekke Nr. 25) for the English summary of the "Boring operations through the quaternary deposits at Skaerumhede," etc. These borings reveal two glacial horizons separated by thick layers deposited under temperate climate conditions. Evidence is presented to show that these thick layers have not been moved from their original situation. "We may take it for granted that they lie where originally deposited and we thus have indisputable evidence of a well-marked inter-glacial period both as regards time and temperature."

The English summary is 26 pages in length, or one-sixth as long as the paper. Many of the publications of the Norwegian Geological Survey are also summarized in English.

## PERSONAL

In 1914 the Department of Geography of the University of Chicago granted the degree of Ph.D. to Wellington D. Jones, Instructor in Geography, University of Chicago; Almon E. Parkins, Instructor in Geography and Geology, University of Missouri; and Stephen S. Visser, formerly Assistant Professor of Geology in the University of South Dakota.

Dr. W. L. Bray, Professor of Botany at Syracuse University, lectured before the Torrey Botanical Club at the American Museum of Natural History on March 9 on "Some Aspects of the New York State Vegetation."

Dr. de Filippi returned to Italy in January after completing the work of his Karakoram expedition. He will give an account of the results at a meeting of the Royal Geographical Society this spring.

*The Monthly Weather Review* for November reprints the paper "Systematic Explorations of the Upper Air with Estimates of Cost" which Mark W. Harrington, Chief of the U. S. Weather Bureau, read before the International Conference on Aerial Navigation at Chicago in August, 1893. Dr. Abbe says the paper is of such historical value that he reprints it for the information of students of meteorology. He adds that Prof. Harrington is still living quietly near Philadelphia.

Professor Douglas W. Johnson of Columbia University, who lectured before the Society on Dec. 22 on the influence of physiographic features upon the European war, delivered lectures upon the same subject before the Geographical Society of Philadelphia on Jan. 15, and the Engineers Club of Trenton on Feb. 11. On March 2 he lectured in the Vassar Institute course at Poughkeepsie.

Prof. Dr. Hans Meyer has been named Honorary Professor of Colonial Geography at the University of Berlin.

Mr. G. T. Rude, of the U. S. Coast and Geodetic Survey, has prepared for publication a general report descriptive of Prince William Sound, Alaska, its resources, towns, harbors, etc., illustrated by numerous photographs.



## OBITUARY

ARCHIBALD ROSS COLQUHOUN. This famous traveler is dead in England at the age of 67 years. Colonel Yule once said of him that he was "born with a genius for travel." In his first important expedition he surveyed about 1,300 miles of new country between Wu-chau and Tali-fu and secured a wealth of information concerning the political and economic conditions of the region across Farther India from sea to sea. He found that the Shan states between Burma and China had become independent and the districts bordering on Burma were discovered to be much richer than had been supposed. His book in two volumes "Across Chryse" is still one of the best books of travel on China. Later he studied a large region from lower Burma to Ssu-mao in behalf of the project of constructing a railroad there. He was special correspondent of the *London Times* in the Franco-Chinese war, Deputy Commissioner for Upper Burma for several years, was a member of the pioneer force which opened Rhodesia in South Africa to enterprise, was the first administrator of Mashona Land, subsequently traveled much in North and Central America and the Far East and wrote several books, including "China in Transformation," "The Mastery of the Pacific," and "The Africander Land." At the end of 1909 he became editor of the journal of the Royal Colonial Institute, which he developed into an important magazine for the discussion of imperial problems under the title *United Empire*.

PROFESSOR JAMES GEIKIE. Professor Geikie, Emeritus Professor of Geology and Mineralogy at the University of Edinburgh and Dean of the Faculty of Science, died in Edinburgh on March 2, at the age of 76. He was one of the founders and a past President of the Royal Scottish Geographical Society and honorary editor of the *Scottish Geographical Magazine*. He was a member of many learned societies in various countries, received many honors and was a prolific and influential writer. Among his best known works are the "Great Ice Age," 1874 (three editions); "Pre-Historic Europe," 1882; "Outlines of Geology," 1884 (four editions); "Earth Sculpture," 1898, two editions; "Structural and Field Geology," 1905 (three editions); "Mountains, their Origin, Growth and Decay," 1913; "The Antiquity of Man in Europe," 1914.



## GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

### BOOK REVIEWS AND NOTICES

(The size of books is given in inches to the nearest half inch)

#### NORTH AMERICA.

**Historical Guide to the City of New York.** (With Tercentenary Supplement). Compiled by Frank B. Kelley. From original observations and contributions made by members and friends of the City History Club of New York. xix and 421 pp. Maps, ills., index. City History Club of New York, 1913. \$1.50 net. 7 x 5.

To the voluntary labors of many willing workers we owe this exhaustive record and description of the many hundreds of spots or buildings on Manhattan Island, and far and wide around it, that have historical interest from the earliest days of European occupancy. The citizens of New York owe much to the City History Club for the printed results of this enormous labor. With this book in hand it is comparatively easy to trace, on the ground, the story of Caucasian beginnings, progress and vicissitudes in our neighborhood. It is the people of this city who should be most interested in the history; and they will find the book an incomparable guide to the field it covers.

**Indian Slavery in Colonial Times within the Present Limits of the United States.** By Almon W. Lauber. 352 pp. Index. *Columbia Univ. Studies in Hist., Econ. and Public Law*, Vol. 54, No. 3. Longmans, Green & Co., New York, 1913. \$3. 9½ x 6½.

An exhaustive account, based on contemporary sources. The facts established are: Slavery among the Indians themselves was often a kindness, as slaves were usually prisoners of war, who would otherwise have been tortured and killed, but who, as captives in battle, might eventually be adopted into the tribe of their captors. The enslavement of Indians among the Spaniards was sanctioned by civil and canon law. The life of the Catholicized Indians in the Spanish Missions was practically a slavery, as no money compensation was given. A law of 1543 aimed to abolish Indian slavery, but it proved ineffective. On the contrary, French law gave no sanction to Indian slavery, but the Royal Council authorized it in 1745. There was considerable slave trade in Indians and free intercourse with Indian women. The French, however, did not look down upon the Indians as an inferior race.

Among the English there were most Indian slaves in the Carolinas, more in Massachusetts, least in Maryland. The Indian slave trade was forbidden in the New England and the Middle Atlantic Colonies (1712-1740). There was much Colonial legislation with regard to fugitive Indian slaves, import and export duties, and other property relations. The punishments in vogue were death, branding, whipping and mutilation. More or less effort was made to instruct the Indians in religion. The decline of Indian slavery was due to the decline in their birth rate, their unfitness for slave labor, and their proneness to run away. It is a sad picture of the treatment of the natives of our present territory at the hands of the European invaders.

DAVID H. BUEL.

**Popular Elementary History of New Mexico.** Prepared by Benjamin M. Read. 186 pp. Map, ills., index. Benjamin M. Read, Santa Fé, N. M., 1914. \$1. 8 x 5½.

Mr. Read's large work, "Illustrated History of New Mexico," is the standard work on that subject. The condensed facts in this small book are taken

from his large work, and the volume is intended for school use and for those who cannot afford to buy his expensive history. There is no doubt of the accuracy of the data which the author adduces. It must be regretted, however, that he has not correlated geography and history. His book is a condensed compendium of historical fact, with only the most casual allusions to the geography of the region. As history is shaped, in an important degree, by geography, it would have vivified the narrative if the geography had been so far set forth as to supply a background for the history. The black-and-white map, reduced in size for the book, contains a very large amount of data, so compressed, however, that it is almost illegible. In the hands of a trained cartographer this map, rich in good material, would have been made most informing if it had been produced on a sufficiently large scale.

**Precise Leveling from Brigham, Utah, to San Francisco, Cal.**

By William Bowie. 67 pp. Maps, index. *U. S. Coast & Geod. Surv. Special Public. No. 22.* 1914. 11½ x 9.

The elevations of the bench marks resulting from the 1912 adjustment of the precise level net of the United States are considered standard. Instead of making a readjustment of the entire level net as new leveling accumulates, the new lines are to be adjusted or fitted in between standard bench marks of the existing net, or between mean sea level and a standard bench mark.

The line of precise levels between Brigham and San Francisco, reported in this publication, is the first to be added to the level net since its adjustment in 1912. It finely illustrates the accuracy of the standard elevations in the vicinity of the Pacific Coast. The line starts at sea level, determined from sixteen years of continuous tidal observations at San Francisco, and follows the route of the Southern Pacific Railroad to Brigham, Utah, where it ends on standard bench mark "R." The new leveling gives, for the elevation of bench mark "R," a value only 0.0179 meter higher than the standard elevation, as given in the level net.

The line is 891 miles in length and fixes the elevation of 315 permanent bench marks and of the rail in front of each of the railroad stations along the route. The standard elevations of the bench marks and of the rail are published in meters and feet. As in all precise leveling in the United States, the datum used is mean sea level.

A departure from recent practice is the publication of the complete abstract of the line. The California section of the line reveals a profile not commonly encountered. Except while crossing the low foothills of the Coast Range, the line west of Elvas, 278 kilometers from San Francisco along the rail route, has an average elevation of less than twenty meters. At Elvas the ascent of the Sierra Nevada Mountains is begun, and a height of 2134 meters is attained in only 159 kilometers, an average grade of about 1.3 per cent.

Included in the report are discussions of the methods and the accuracy attained in precise leveling.

On the leveling between San Francisco and Brigham the observer used a motor velocipede car to transport his party and instruments to and from his field work. This is the first time that a power car has been used in precise leveling.

A study of systematic errors of leveling was made. It was based upon the data for five lines, which include the times of the runnings of the different sections, the weather conditions prevailing and the difference between the forward and backward runnings. The largest systematic errors are found in leveling over steep grades, and the errors are functions of the time of day, the amount of sunshine, the strength of the wind and, possibly, the direction of the running, that is, toward or away from the sun. The author believes that most accurate results in leveling can be obtained in the afternoon, with an overcast sky and a light wind.

A valuable feature of the publication is the index maps at the end of the volume, which give the general location of the line of levels and of the bench marks.

H. G. AVERS,

Computer, Coast and Geodetic Survey.

## CENTRAL AMERICA AND WEST INDIES

**Porto Rico: Past and Present, and San Domingo of To-day.** By A. Hyatt Verrill. 357 pp. Map, ills. Dodd, Mead & Co., New York, 1914. \$1.50. 8 x 5½.

A good description of Porto Rico, based upon personal observation. Porto Rico has some 800 miles of excellent roads, suitable for the touring car; and the denudation of the native forest growth enhances the views obtainable from the automobile. A really first-class hotel with up-to-date accommodations is said to be much desired. The Porto Ricans have a custom of planting climbing vines about the unsightly poles which support the wires conveying electric power. The inhabitants are said to be thoroughly loyal to this country and ready to fight in its behalf. English, although the official language, is not as much in use as Spanish, and does not appear to be gaining the ascendancy. To bring this about, it would at least be necessary to teach English only in the public schools.

DAVID H. BUEL.

**Cuba: Past and Present.** By A. Hyatt Verrill. 257 pp. Map, ills. Dodd, Mead & Co., New York, 1914. \$1.50. 8 x 5.

A most sympathetic, and yet impartial account of the "Pearl of the Antilles," designed to meet the wants of the prospective tourist or settler. It is stated that Cuba has benefited in every way by freedom from Spanish rule. While the usual tourist's description of native manners and customs, of points of interest, and of national history is entertaining, one of the most noteworthy portions of the book is that which removes the idea, prevalent in this country, that the Isle of Pines is an Eldorado for settlers from the United States. While not denying that there is some good land on the island, and that some of our citizens have done well there, the writer insists that at least a third of the land is worthless and that the rest is less fertile and productive than that of Cuba, and our people are advised not to think of settling there. Much is made of the Commercial Clerks' Club of Havana, which seems very much like our Young Men's Christian Association. The chapter "A Few Facts and Figures" is important, giving an account of the area and population, the climate and rainfall of the interior, health and sanitation, and trade and finances.

DAVID H. BUEL.

## SOUTH AMERICA

**Brazil and the Brazilians.** By G. J. Bruce. vii and 307 pp. Ills., index. Dodd, Mead & Co., New York, 1914. \$3. 9 x 6.

A book, far above the usual tourist record, of his first experiences in a foreign land. The writer is a practiced observer of the races of men dwelling in the tropical belt. His contention is that the researches of anthropologists and ethnologists in regard to the aborigines of Brazil have as yet given only negative results. He considers the racial amalgam known as the modern Brazilian as active, energetic, intelligent, affable and impressionable. Only in his attitude toward the women of his household does he find him lacking in the modern spirit of courtesy, respect and veneration. He regards the cannibalism of some of the Indian tribes of the Amazon as a savage outpouring of hatred of an enemy which by civilized man is expressed by social ostracism. The account of the diamond and rubber industries and of the flora and fauna of Brazil, especially of the Amazon, is both instructive and interesting. The author says that Brazil is reaching out into world commerce and world politics and that in the near future, in union with Argentina and Chile, the A-B-C alliance will become a rising factor to be reckoned with as a world power.

DAVID H. BUEL.

**Bolivia: Its People and Its Resources, Its Railways, Mines and Rubber-Forests.** By Paul Walle. Translated by Bernard Miall. 407 pp. Maps, ills., index. T. Fisher Unwin, London. C. Scribner's Sons, New York, 1914. \$3. 9 x 6.

A more than usually thorough description of Bolivia, by an experienced

observer, who, through two visits, twelve years apart, is well fitted to note its progress. We are assured that Bolivia, although stripped of its sea-coast through the fortunes of war, is making sure and steady progress in all that tends to its own betterment. Political conditions are now more stable, and really patriotic and enlightened men are directing the destinies and policy of the nation. Of course, the obstacles to be overcome in development work along modern lines are manifold. The greatest of these is the exploitation of the native Indian races on all sides. Statistics are given to show that, under their unfair and harsh treatment, the native population is diminishing, while the hardier half-breed population is on the increase. Commercial development is also slow, and facilities for transportation are primitive and inadequate. Popular education is still in its infancy and coördination of higher education is lacking. The principal industries are rubber, in which Bolivia is second only to Brazil, cocoa, and the mining of gold, silver, tin, copper, and bismuth. The llama, the alpaca, the vicuña, and the chinchilla are indigenous and thriving, but the commercial possibilities which they afford are not much utilized. The book is an excellent English translation from the original French.

DAVID H. BUEL.

**The Young Man's Chances in South and Central America: A Study of Opportunity.** By William A. Reid. 173 pp. Southern Commercial Congress, Washington, D. C., 1914. \$1. 7½ x 5½.

What are the chances of success in South and Central America for men from the United States? In this book the author answers the question, and he knows his subject, for he was associated with the South Americans for twelve years and has carried on commercial inquiries throughout Central and South America.

The occupations in South America in which men from the United States might engage and the chances of success are considered for agriculture, engineering, salesmanship, teaching, journalism, manufacturing, hotel business, law, insurance, banking, medicine, dentistry, hospitals, nursing, etc. The salaries and living expenses in Brazil are cited as typical of what will be found throughout the continent. Stories of success and of failure are given, and it is shown how necessary for success it is to have a knowledge of Spanish, or in Brazil of Portuguese, as well as an understanding of the peoples' characteristics and of their modes of carrying on business.

Several large syndicates of the United States which are developing South America are described. "The greatest official fount of knowledge of Latin-American affairs is the organization, at Washington, known as the Pan-American Union," whose plan and purpose Mr. Reid proceeds to describe. In the appendix are lists of the companies, with offices in the United States, that are engaged in active construction work in Latin-America, some of the leading periodicals of the United States that pay special attention to those regions, and prominent United States firms engaged in trade with them.

WILBUR GREELEY BURROUGHS.

**In Deutschland und Brasilien.** Lebenserinnerungen von Gustav Stutzer. 2nd edit. 363 pp. Ills. H. Wollermann, Braunschweig, 1913. Mk. 4. 9 x 6.

An interesting story of a life full of incident. Passing over Stutzer's account of his life at home, we may say that he also lived long in Brazil and gives an admirable picture of life there, among German colonists and natives alike. It is good reading. If he adds little to our knowledge, his own literary gift makes his book worth while. The colonies in the interior, into the nineties, were productive, but without access to markets because of difficulties of transportation. He made no Brazilian friends and gained no sympathy with Brazilian ideals, though he speaks very warmly of Brazilian manners. Most interesting is his success in producing what was practically "certified milk" on an estate in the Serra do Mar above Santos. He reports southern Brazil as in the main delightful, but lacking for the Germans in spiritual life. For instance, he was able to attend worship under a proper Lutheran pastor only once in seventeen years, a hardship, we might venture to remind him, that does not befall his countrymen who emigrate to the United States.

MARK JEFFERSON.

## AFRICA

**Aegypten.** Seine volkswirtschaftlichen Grundlagen und sein Wirtschaftsleben. Von Franz Magnus. xvi and 251 pp. J. C. B. Mohr, Tübingen, 1913. Mk. 6.  $9\frac{1}{2} \times 6\frac{1}{2}$ .

The author has provided a very close study of the economic condition of Egypt just before it passed into the condition of a British protectorate. The former condition of Egypt had been notoriously chaotic, but recent events may be expected to bring about a better condition of affairs and to leave many of the themes here noted with no more than an historic value as memorials of a period that has passed. Dr. Magnus here examines the agricultural value of the valley at the principal points from the delta to the Sudan. He records the control of the Nile, the treatment and supply of labor and the opportunity for diversity of product. His examination of the cotton possibilities of the Nile and Sudan is particularly minute and instructive. He assumes the monopoly of the United States in the staple and is zealous to discover a way in which it may be broken for the better advantage of German industry. His assumption of this American monopoly is pardonable, but he errs in ascribing it to the creation of a commercial monopoly. It is really the natural monopoly of the superiority of staple in the fiber from our Southern States; this monopoly will automatically shift to any suitable land which can produce a better staple under conditions of commerce. Dr. Magnus shows very clearly the interdependence of the river and of the population as operative now in the valley quite as effectively as through a long series of ages past. These chapters are particularly readable and well worthy of study.

WILLIAM CHURCHILL.

**From Cataract to Equator.** By James T. Dennis. 217 pp. Ills. R. G. Badger, Boston, 1913. \$1.50.  $7\frac{1}{2} \times 5\frac{1}{2}$ .

The author is an Egyptologist. He has written a good, sound book on the tourist route up the Nile from Assuan, first by boat to Wadi Halfa, second by train across the desert to Khartum, and then by steamboat to Gondokoro, in the equatorial regions and the farthest point of navigation from Egypt. Speke, Baker, Junker and other pioneer explorers described to us this same long stretch of the Nile; but they made the journey under great difficulties, one or two generations ago, long before white enterprises began to invade the upper Nile. Mr. Dennis traveled with modern facilities and in comparative comfort, though torrid heat, a plague of flies and mosquitoes and some other annoyances tended to reduce the measure of enjoyment.

This book is at present the best source of information we possess, outside of various official reports, of the conditions of travel, the state of the Nile and its shores, the attitude and circumstances of the Shilluks, Dinkas and other tribes with whom the early explorers made us familiar, the life of the river, the advancement of white enterprises, and the sudd region, and how its obstruction of navigation is overcome. The author gives excellent descriptions of Khartum, Omdurman and other points of special interest. He makes a few geographical slips, of which only one will be mentioned here. He confuses his narrative once or twice by allusions to the right or left bank of the Nile, ignoring the now fixed rule that the right bank of a river is the shore that is on our right hand as we are looking downstream.

**Anthropological Report on Ibo-Speaking Peoples of Nigeria.**

By N. W. Thomas. Part 4: Law and Custom of the Ibo of the Asaba District, S. Nigeria. 208 pp. Map, ill., index. Part 5: Addenda to Ibo-English Dictionary. 184 pp. Part 6: Proverbs, Stories, Tones in Ibo. 114 pp. Harrison & Sons, London, 1914.  $9 \times 5\frac{1}{2}$ .

**Specimens of Languages from Southern Nigeria.** By Northcote W. Thomas. 143 pp. Map. Harrison & Sons, London, 1914.  $11 \times 7\frac{1}{2}$ .

These four volumes complete this highly valuable anthropological report. The fourth volume is devoted to a study of law and custom. There are great intricacies in the life of these fetishistic communities, and the whole subject

bristles with difficult problems. Mr. Thomas is a painstaking recorder and accurate observer, and his suggested interpretations of customs are shrewd instances of insight into the African habit of thought. Palaver is the bane of the anthropologist in the African field. The savage is prone to regard speech as an amusement and seldom recognizes the value of linking it with real thought. Recognizing this difficulty, we are amazed at the success with which Mr. Thomas has compiled a well-supported treatise on the law of the bush in the primary rights of person and the tangle of rights of property. The wife and, equally, the slave seem to exist only as in possession; title to them may pass in one fashion or another, but they never cease to be property.

The last volume provides a large addition to the vocabulary already published. The Ibo of Nigeria is spoken in a sort of recitative, but with the important distinction that the play of the tones is not merely a matter of ornament but it is essentially a determinant of the signification of the word; therefore the tone must be indicated for each word when it is recorded. The value of these Ibo tones has been carefully studied from the phonogram and expressed as nearly as possible upon our musical scale, thus providing the means whereby facility may be acquired in their use.

WILLIAM CHURCHILL.

**The Sultanate of Bornu.** Translated from the German of Dr. A. Schultze.

With additions and appendices by P. Askell Benton. 401 pp. Map, index. Oxford University Press, New York, 1913. 7 x 5.

A book that should be in every collection of African literature, because it not only gives the quintessence of what Barth and Nachtigal wrote on Bornu but also the important facts revealed in the literature of the past twenty years. Dr. Schultze's book, of which this is a translation "with additions," is the first monograph that has been written on this very interesting and economically important part of Africa. Schultze, who was a member of the Anglo-German Yola-Chad Boundary Commission, covered in his book the essentials of the literature already known, together with his own observations, dealing generally with all lines of inquiry and correcting statements that he could prove to be erroneous. It is a model German monograph, most painstaking in the writing and ably covering the ground.

Mr. Benton, who is a British official in the Bornu Province of Nigeria, has made a faithful translation of the original and has added to it many footnotes of his own, enclosed in brackets, which enrich the original work. The book is all the more timely because, unfortunately, Nachtigal's great work has never been translated into English.

## ASIA

**Annals and Memoirs of the Court of Peking.** (From the 16th to the 20th Century.) By E. Backhouse and J. O. P. Bland. 531 pp. Ills., index. Houghton Mifflin Co., Boston, 1914. \$4.50. 10 x 6½.

The authors have already shown in their great work upon the Empress Dowager a remarkably sympathetic appreciation of the Chinese habit of thought. They present a clear picture of the reforming power of the victorious general when attacking the palace corruption of the Mings. They record the virtuous days of the Manchu dynasty when in its youthful strength, and trace the inevitable progress of deterioration when the palace servants and the palace women led the emperors into ease and then into vice. They point out the sturdy morality of the Chinese people and make it clear that a dynasty must totter when its conduct transgresses the rules of this morality which has existed as a rule of conduct for millenniums in this ancient civilization. This is the central theme of this volume of the history of the last four centuries, a theme most excellently elaborated. They are cautious in their forecast of the future of China under its present non-dynastic rule. China itself is cautious and is willing to await the course of events. As regards their attitude toward President Yuan Shih-k'ai, it may be significant that they note with particular force the fact that both the Manchu dynasty, on whose ruins he sits in rule,



and the Ming dynasty, which the Manchus overthrew when the time was ripe, began with a victorious commander ruling in accordance with the wisdom of the Chinese sages.

WILLIAM CHURCHILL.

**A Winter in India.** Light Impressions of Its Cities, Peoples, and Customs. By Archibald B. Spens. xiii and 302 pp. Map, ill., index. Dodd, Mead & Co., New York, 1914. \$1.75. 8 x 5½.

This is an entertaining record of a winter's tour in India. From place to place the reader follows the author with unflagging interest and enthusiasm. With the government officials he inspects the Umballa jail, traverses the barren desolation of the Khyber Pass, learns at Amritsar the story of the Gurus and the foundation of Sikhism, sees the holy city of Benares at prayer and is repelled by the wretched, soulless habitués of a Bombay opium den. These are but a few of the places visited, and each is charmingly and vividly portrayed. The author's description of the domes and pinnacles of the immortal Taj Mahal at Agra and his story of the erection of this world-famous mausoleum are excellent. Historic Cawnpore, Lucknow, and Delhi—scenes of the three great sieges of the Sepoy Mutiny—are treated at length. The volume, illustrated throughout with superior photographs, closes with a translation of Count Charles de Lesseps's paper on the Suez Canal. "Merely a little book of impressions," the author calls it, but impressions which convey, in no small degree, much of the wondrous color, the incongruity, and the weird fascination of India.

E. M. GEORGE.

**Beyond the Pir Panjal.** Life and missionary enterprise in Kashmir. By Ernest F. Neve. viii and 178 pp. Ills. Church Missionary Society, London, 1914. 2s. 6d. 9 x 6.

The Pir Panjal range forms the highest line of the mountain barrier which divides Kashmir from the plains of Northern India. Beyond the Pir Panjal, in Kashmir, the author lived and worked for more than twenty-five years. Dr. Neve describes the country and its people, their life, customs, industries and religions. He tells of the noble work that is being carried on by Christian missionaries. The Christian medical work is doing great good. In the Mission Hospital in Kashmir last year, he writes, there were "23,642 new out-patients, and 1,979 in-patients in the hospital." The people represented every class of society. They came from the villages scattered throughout Kashmir, the plains of India, and some few from Tibet, Afghanistan, and even Yarkand and Khotan. More medical missionaries and missions are needed. The author says: "If what I have written should inspire any qualified men or women, doctors or nurses, to take up such work as their career, the time spent in writing these pages will have been indeed worth while." The book is well illustrated with photographs.

WILBUR GREELEY BURROUGHS.

**Life in an Indian Outpost.** By Major Gordon Casserly. xvi and 320 pp. Ills. 320 pp. T. Werner Laurie, Ltd., London, 1913 (?) 12s. 6d. 8½ x 5½.

The author writes of the daily life in a far British outpost in India. One cannot but feel the appeal in the descriptions of a place so far removed from the most limited civilization as is Buxa at the foot of the Himalayas. The narrative relates to a country of jungle-covered hills and dense forests, where wild game abounds, to forest fires and the monsoons, to glowing Indian colors, natural and artificial, the latter relating to the Indian Durbar, and sumptuous surroundings in the palaces of the native princes. Chapters 6 and 7 give interesting accounts of the rogue elephant in the jungle and its "hunting down." Major Casserly has written many curious personal incidents, and no page of his book is lacking in interest.

ALICE CHURCH BARTLETT.

**L'Île de Chypre.** Séjour de 3 ans au pays de Paphie-Vénus. Par René Delaporte. 359 pp. Joseph Barratier, Grenoble, 1913. Fr. 4. 9 x 6.

A French description of the third largest island in the Mediterranean, based upon a three years' residence there by a former director of *L'Alliance Française*



in Cyprus. The writer admits that he was prejudiced against the English administration of the island because of the duties imposed upon his educational equipment, but he confesses that further experience modified his view, so that he regards the British occupation of Cyprus as most beneficial to the island. Among the fine descriptions of the geography, history and resources of Cyprus, the account of the educational work of *L'Alliance Française* is most notable. The object of this organization is to diffuse knowledge of the French language and literature among foreign nations. As a result of three years of effort, there are 1,500 French-speaking Cypriotes in the island. It seems that French is the commercial language of the Orient.

DAVID H. BUEL.

**Histoire du Cambodge depuis le 1<sup>er</sup> siècle de notre ère** d'après les inscriptions lapidaires, les annales chinoises et annamites et les documents européens des six derniers siècles. Par A. Lecière. xii and 547 pp. P. Geuthner, Paris, 1914. Fr. 25. 10 x 6½.

With this volume the author completes a list of more than thirty titles of works upon Cambodia, the product of more than a quarter of a century as French Resident in that protectorate kingdom. Here we have the history of the Khmêr from the Christian era's beginning, a very complete record, and substantiated by monumental inscriptions and carefully kept Chinese annals. The author has devoted an enormous amount of research in remote chronology in order to synchronize the events of Cambodian history with the records of Siam at one frontier and of Annam at the other. The result is highly to be commended, and in the instances, not many, where it has been found impracticable to establish a date with accuracy, the various possibilities are set forth for our guidance. The association of the principal land masses of the country with the military and economic life of the kingdom is clearly set forth in the text, with the result that this history of the kings who rode the white elephant and were screened with many towered parasols is equally a sketch of the geography of the Mekong Delta.

WILLIAM CHURCHILL.

**The Malay Peninsula.** A Record of British Progress in the Middle East. By Arnold Wright and Thomas H. Reid. 352 pp. Map, ills. Charles Scribner's Sons, New York, 1912. \$3. 9 x 6.

The aim of this work is to give a comprehensive account of the development of British influence in the Middle East from the earliest times to the present day; and with the aid of documents which, up to this time, have escaped attention new phases of this history are set forth.

The commercial possibilities and the present industries are described in detail. The Federated Malay States supply the world with half the tin consumed, while the rubber industry is rapidly pushing to the front. The manners, customs, and occupations of the people, also, are considered.

In dealing with the industries of the Non-Federated States the authors write: "The most beautiful and characteristic of the products of Trengganu are the brass utensils with a white finish, which gives them the appearance of nickel plating. The secret of this process is jealously preserved by the workers, and not without good reason, for these Trengganu vessels fetch a price about four times that of the ordinary brass production."

The book is illustrated profusely with photographs, and contains a large colored map of the Malay Peninsula.

WILBUR GREELEY BURROUGHS.

#### AUSTRALASIA AND OCEANIA

**Native Tribes of the Northern Territory of Australia.** By Baldwin Spencer. xx and 516 pp. Map, ills., index. The Macmillan Co., New York, 1913. \$5.25. 9 x 6.

Ethnologists everywhere will share the sorrow which clusters about Professor Spencer's dedication of this volume "to the memory of my friend Frank J. Gillen." Together they have prosecuted years of research upon

the Australian aboriginals from the south coast of South Australia through the deserts of the center. The final stage of this minute exploration, the running of the line of anthropologic study to the north coast at Port Darwin, has fallen to Professor Spencer alone. It is a fitting conclusion of the series; the great work has been well done. It is to be hoped that the surviving author will continue his research upon the many particulars which in the development of this work have been left for more detailed examination. Or if not he, then some other will surely build upon the foundation so firmly laid.

In this volume we find the final expression of the continuity of the austral culture plane clear across the continent. The ceremonies and the motives of the corroboree and the initiations seem derived from a common stock. The beliefs as to past, present and future seem to be in remarkable unity. We are pleased to see that Professor Spencer makes so clear a statement of the once disputed theme of the scission of the ancestral spirit (Yalmuru and Iwaiyu) and the dual function in the continuation of the race. It makes it clear that this people is so low in intellectual attainment that the most elemental principles of genetics are too high for their comprehension. Another index of low development is the absence of the recognition of the shelter idea, for the Australians have not reached the knowledge of that fixed shelter to which they might retire in case of need or to avoid climatic discomforts, from which evolves the theme of house and eventually home, and the portable shelter from which evolves the idea of raiment. The linguistic content of the volume is set within an appendix. It contains vocabularies of the Kakadu and Melville Island tongues, each amounting to some 400 vocables and corresponding with the general exiguity of austral language which in general comprise somewhere between 600 and 1,000 vocables, yet with considerable complexity of agglutinant forms and a complicated system of personal pronouns and paucity of numerical terms.

WILLIAM CHURCHILL.

**The Ways of the South Sea Savage.** A record of travel and observation amongst the savages of the Solomon Islands and primitive coast and mountain peoples of New Guinea. By Robert W. Williamson. 308 pp. Map, ill., index. Seeley, Service & Co., London, 1914. 16s. 9 x 6.

The author's former work, "The Mafulu of British New Guinea" (*Bulletin*, xiv, p. 937) was a welcome addition to the ethnography of Papua. Unfortunately this succeeding volume falls far short of that level. Five chapters are devoted to the Rubiana Lagoon in the Solomon Islands without adding particularly to the sum of information upon that little-known region. The remainder of the volume is given over to Papua. Much of this repeats in a sketchy form the better ordered information about the Mafulu which has already appeared in the former volume; the remainder is nothing more than the journal of experiences of a man to whom the tropical forests were wholly unknown. The disappointment lies in the fact that the promise of the Mafulu book has not come to fruition in this later work. Nevertheless, the author's observations have the distinct value that they are quite free of prejudice and that he is sedulous to make his testimony in all particulars competent, relevant, and material. We recall from the former work that Mr. Williamson has passed his business life as a solicitor, and in this we see that the training in the laws of evidence is an excellent equipment for ethnological work. In the present condition of our knowledge of New Guinea—the reconnaissance stage—it is not to be expected that any record of brief sojourn can afford a sympathetic comprehension of the motive and explanation of things seen, but we cannot have too much of such careful observation as is here presented without the slightest suggestion of attempt at interpretation. We note Mr. Williamson's first experience with the common gesture signifying "come here." It was in Rubiana, and the author had beckoned in the usual European fashion without conveying his meaning; the local custom he describes as "beckoning with the palm of the hand facing downwards and all the fingers moving instead of only one." Ethnologists will recognize not only the accuracy but the completeness of this description, and therefrom will have no difficulty in evaluating the testimony of such an observer.

WILLIAM CHURCHILL.

## EUROPE

**Lombard Towns of Italy or the Cities of Ancient Lombardy.**

By Egerton R. Williams, Jr. xiv and 590 pp. Map, ills., index. Dodd, Mead & Co., New York, 1914. 9½ x 6.

A second edition during the current year of an account of the history, architecture, and art of the towns of Lombardy. It is the last volume of a trilogy begun ten years ago, the preceding volumes being the "Hill-Towns of Italy" and the "Plain-Towns of Italy." It is intended as an aid to tourists who are not content with the brief accounts of "Baedeker," and also to give to those who are not tourists some idea of the beauties of Lombardy. The half-tone reproductions of photographs of Lombard landscapes, churches, paintings and sculptures are unusually fine. The places described are Bergamo, Monza, Saronno, Varese, the towns of the Olona Valley, Pavia, Lodi, Crema, Cremona, Mantua, and its environs. The history of the various places visited is given at length, and the descriptions of the architectural beauties of Lombard churches and works of art are minute and discriminating. In connection with Monza is given the story of the Iron Crown and Napoleon's crowning himself with it. The writer rejects the usual story of Napoleon personally leading the charge over the bridge of Lodi. The facts about Stradivari and his Cremona violins are briefly recorded. There is an extended description of the Certosa Monastery of Pavia and its artistic beauties. About a third of the book is taken up with an account of Mantua, in which the history of the powerful Gonzaga family is related at considerable length. The traditional house and garden of Vergil at Mantua is also noticed.

DAVID H. BUEL.

**Rome of the Pilgrims and Martyrs.** A study in the martyrologies,

itineraries, syllogæ, and other contemporary documents. By Ethel Ross Barker. xiii and 379 pp. Maps, index. G. H. Doran Co., New York, 1912. \$3.50. 9 x 6.

A popular handbook, aiming to give in a concise, yet complete manner the latest results of archeological research on the earliest documents bearing upon Roman Christianity of the first three centuries. Internal evidence makes it clear that the authoress is a Roman Catholic. She follows in the main the conclusions of the Ballandists Delahaye and De Smedt, of Duchesne, de Rossi, and Marucchi, all convinced Roman Catholics. The name of the Lutheran Harnack is mentioned, but his views are not quoted. It is assumed as beyond doubt that Peter lived and died in Rome. The position taken is that of the Roman Catholic higher critics, who set down the larger part of the miraculous legends of the saints as unhistoric tales of the tenth century. The topography and monuments of Christian Rome are first described; next, the views of the early Roman martyrs and of the pilgrims to their shrines are explained. Then follow briefly, but in detail, an account of the *Liber Pontificalis*, the Roman *Itineraria*, the *Acta Martyrum*, and the *Syllogæ*, or ancient Christian inscriptions. None of the documents described antedate the fourth century, and many are as late as the seventh or eighth century.

DAVID H. BUEL.

**The Balkans: Roumania, Bulgaria, Servia, and Montenegro.**

By William Miller. xix and 476 pp. Map, ills., index. G. P. Putnam's Sons, New York, 1911. \$1.50. 8 x 5½.

The book is a reprint of the first edition published in 1896. Though not up to date, it fulfils adequately a most desirable purpose. It clears up the perplexities that make it difficult for the general reader to grasp the meaning of Balkan affairs, because he does not understand the underlying influences, some originating many centuries ago, that have been factors in shaping events. It is impossible to understand these matters without some knowledge of Balkan history—so here we have the main features of this history clearly and concisely unfolded. It has much to do with the mutual jealousies of Bulgarian and Serb, the struggle of various races for supremacy in Macedonia, the alternate friendship and enmity of the Russian and the Turk—all of which facts have their root deep down in the past annals of the Balkan lands. Many will

be surprised to learn that there was a time when the Servian and Bulgarian Empires were great powers. The book is to be commended to all who would read intelligently the history that these four states have recently been making.

**The History of the Grain Trade in France, 1400-1710.** By Abbott P. Usher. (*Harvard Economic Studies*, Vol. 9.) xv and 405 pp. Harvard Univ. Press, Cambridge, 1913. \$2. 9 x 6½.

This volume should prove of interest primarily to those who are concerned with the history of commerce. This is because the history of the grain trade, as illustrated in the case of France during the period covered by this book, is an important chapter within the broader field of commercial history. As the author points out, the real significance of the grain trade is that it serves to portray some of the first steps in the evolution of methods of marketing. For reasons which cannot be entered into here, the history of France from 1400 to 1710 tends to illustrate better than that of either England or Germany the preliminary stages in this evolution. The author says that the real background in the history of the grain trade was the idea that the experiences of famine years ought to be remedied, and that this could be accomplished, in large part, by a different organization of the market.

The book is a scholarly work, and is based largely upon primary sources, consisting of both manuscripts and documents already printed. A valuable bibliography is appended, which will be helpful to those who may wish to dig deeper into various topics outlined in the successive chapters.

HARVARD L. BISHOP.

**Germany and Its Evolution in Modern Times.** By Henri Lichtenberger. Translated from the French by A. M. Ludovici. 440 pp. Constable & Co., Ltd., London, 1913. 10s. 6d. 9 x 6.

A monograph on the economic, political, religious, and artistic evolution of the present German Empire. The relative importance ascribed to the different aspects of modern Germanic evolution is shown by the amount of space allotted to each. This is as follows: economic evolution, 58 pages; political evolution, 145; religious evolution, 125; artistic evolution, 89. The introduction gives a thoughtful comparison between the mediæval and the modern attitudes of mind and habits of thought. The account of the economic evolution is clear, but somewhat condensed. The most interesting part of the story of the rise and growth of the present empire is that dealing with the events leading up to the Franco-Prussian War of 1870 and the responsibility for that struggle. The account as written from the French standpoint, although striving to be fair, rather favors the French view.

In the religious division of the work, the chapter on the rise, growth, and present standing of the protestant spirit in Germany is the most interesting. This whole section is quite impartial and free from religious bias. The account of the modern science of religion could have been more extended, with benefit to the work. In the artistic portion of the book due prominence is given to Wagner in the field of music. The influence of Nietzsche is shown to have been as important in the artistic realm as it has been prominent in the sphere of philosophy and religion. In conclusion the author ventures to hope that, in the future, Germany will ascend from its own improvement and betterment to the improvement and betterment, even the unification, of Europe and of the human race. Current happenings in Europe hardly incline one to expect the realization of such altruistic hopes.

DAVID H. BUEL.

**Studies in Anglo-Jewish History.** By the Rev. H. P. Stokes. xii and 303 pp. Map. Jewish Historical Soc., London, 1913. 9 x 6.

The introductory chapters discuss certain general facts upon the relation of the Jews to English social life. Inasmuch as the state papers of the Rolls Office are drawn in Latin and are rarely bilingual, it has taxed the ripe scholarship of Dr. Stokes to correlate the *magister* and *episcopus* of these papers with the official dignities of the Jewish community. Having cleared away some of these difficulties, he devotes the major theme of his work to the study of the Jewry of Cambridge from its beginning to the local expulsion by order of the

Dowager Queen Eleanor in 1275, fifteen years prior to the general expulsion of all Jews from England. This Jewry seems to have passed a singularly peaceful life. The records carry but one mention of tumult, and that amounts to no more than the passing mention of "the Jew slain." Another note in the records ascribes to a Cambridge Jew, a convert, the beginning of the ritual murder charge which has become historic under the legend of Hugh of Lincoln. Of the inner life of the Jewish community no record has persisted. This was inevitable, for the documents which have come down to us are only such as deal with property rights, records of loans and supplementary proceedings, of pledge and pawn, etc. It is a most exhaustive study of obscure material, a footnote which will be found to shed an important light upon the greater history of the time.

WILLIAM CHURCHILL.

#### WORLD AND PARTS OF IT

**Geschichte des Volkes Israel.** Von Rud. Kittel. Vol. 1: Palästina in der Urzeit. Das Werden des Volkes. Quellenkunde und Geschichte der Zeit bis zum Tode Josuas. 2nd edit. (Handbücher der Alten Geschichte.) 668 pp. F. A. Perthes, Gotha, 1912. Mk. 16. 10 x 6½.

This is a second edition of a work already standard, but, in the time which has elapsed since the former edition, great additions have been made to our comprehension of the subject matter; accordingly, the present revision is tantamount to a rewriting of the whole work. So much of the volume as is conditioned by the higher criticism may properly be left to the consideration of theologians. But there is a considerable accumulation of data herein which is pertinent to the study of economic and social geography. The first third of the volume reviews the most recent work of exploration conducted upon the most promising sites of former culture in Palestine. Successive strata of settlement deposits enable the author to identify the great epochs of the Jewish state as set forth in the Old Testament. The spade and the pick have not been laid aside until the undisturbed hardpan has been reached; thus we have data bearing upon a culture anterior to the Exodus which may be established as far back as the paleolithic age.

WILLIAM CHURCHILL.

**The Ottoman Empire, 1801-1913.** By William Miller. (Cambridge Historical Series.) 547 pp. Maps, index. G. P. Putnam's Sons, New York, 1913. 7½ x 5.

The volume deals with the history of Turkey in Europe during the period named. It is, of necessity, entirely concerned with the Eastern question, which one of the European diplomats, as quoted by this work, describes as the case of a very sick man who will probably die before all arrangements have been completed for the disposal of his estate. Prominent among the topics treated are the War of Greek Independence of 1821-9 and Lord Byron's part in it, the Crimean War, the Russo-Turkish War of 1877, and the assassination of King Alexander and Queen Draga of Serbia in 1900. The most interesting chapters are those which close the work, on the Turkish Revolution of 1908, the Italo-Turkish War of 1911, and the War of the Balkan League in 1912-13.

DAVID H. BUEL.

#### ANTHROPOGEOGRAPHY

**Balder the Beautiful. The Fire-Festivals of Europe and the Doctrine of the External Soul.** By J. G. Frazer. Vol. 1: xx and 346 pp. Vol. 2: xi and 389 pp. Index. Macmillan & Co., London, 1913. £1, 2 vols. 9 x 6.

With these two volumes Dr. Frazer completes his great series of the "Golden Bough." As with Nemi he began the tale of pagan faith so with Nemi he completes the story, which has wandered leisurely and profitably around the world. As at Nemi, he whose duty it was to slay the King of the Wood must first pluck the golden bough, so now we find at the end what that golden bough was, the mistletoe growing on the oak, and thus we are led in the beliefs of our northern ancestors to the story of Balder the Beautiful, in whose behalf

death was removed from every object save the overlooked mistletoe, and by mistletoe he was slain.

In this great work the principal theme is the substance of faith, the substratum faith which has endured from the beginning of time. The world around and in every age there is a new faith and an old belief and superstition. Jewry was filled with ancient beliefs which we may trace to Akkad and Sumer. Under Olympus subsisted the elder faith of the Pelasgians and of Crete. Capitoline Jupiter had to tolerate the nine gods of Clusium and a host of Latin, Sabine, Etrurian practices. Through Christendom bubbles up the elder belief in the gods of Greece and Rome; heaven is partly Valhalla; the religion of the Druids can scarcely be shut out of garth and close. What, then, is the ultimate religion of our race? What is the faith of those of us who derive from the British Isles, a faith which we scorn to profess but which unthinkingly we practice? Dr. Frazer does not answer this question in set terms, but he makes it clear. Despite the successive tides of culture which have advanced the race in knowledge and in religion there remains at the basement of the spiritual life a stock of beliefs which can have come from none other than the Mediterranean race. A tremendous moral force lived in this puny man of prehistory. We trace him in his recent survivals, the pygmies of the Aruimi forest, the Bushmen of the Cape—the lowest of savage folk. It is a startling thought that we have been able to advance so little from the prehistoric man. All our arts, except those of the potter and perhaps of the weaver, are of later acquisition. From his cave we have advanced to the palace; his cromlech scarcely suggests the cathedral; generations and ages have given us the amelioration of life. Yet his religion was so strong that it has outlasted the course of time; in our superstitions we see that his faith has come down to us, and half shyly and more than half with a dread of magic we practice his rites as he did when the world was young.

WILLIAM CHURCHILL.

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## NEW MAPS

EDITED BY THE ASSISTANT EDITOR

*For system of listing maps see p. 75 of this volume*

MAPS ISSUED BY UNITED STATES GOVERNMENT BUREAUS

U. S. GEOLOGICAL SURVEY

*Topographic Sheets*

*(Including Combined and Special Topographic Maps)*

**Alaska.** Reconnaissance Map of Chitina Quadrangle, Copper River Region, Alaska. Surveyed in 1898, 1900, 1902, 1905, 1908, 1911 and 1913. 1:250,000. 62° - 60' N.; 146°20' - 142°0' W. Contour interval, 200 ft. 1914.

[This is a new edition, issued separately, of the map which was originally published as Pl. 1 of the *U. S. G. S. Bull.* 374 in 1909. The additional topography shown includes a large area of the Chugach Mts. east of the transverse valley of the Copper River and a strip along the coast for 70 miles east of Controller Bay. Greater care is used in differentiation between surveyed and unsurveyed sections of the map, various sections whose contours were drawn out in full lines on the first edition now reverting to the broken lines indicating probable topography, unsurveyed.]

**California.** (a) Avena Quadrangle. Surveyed in 1912. 1:31,680. 37°52'30" - 37°45'0" N.; 121°7'30" - 121°0'10" W. Contour interval 5 ft. Edition of Dec. 1914.

(b) Burnham Quad. Surveyed in 1912. 1:31,680. 38°0'0" - 37°52'30" N.; 121°15'0" - 121°7'30" W. Interval 5 ft. Edit. of Dec. 1914.

(c) Lathrop Quad. Surveyed in 1912. 1:31,680. 37°52'30" - 37°45'0" N.; 121°22'30" - 121°15'0" W. Interval 5 ft. Edit. of Jan. 1915.

(d) Manteca Quad. Surveyed in 1912. 1:31,680. 37°52'30" - 37°45'0" N.; 121°15'0" - 121°7'30" W. Interval 5 ft. Edit. of Dec. 1914.

(e) Peters Quad. Surveyed in 1912. 1:31,680. 38°0'0" - 37°52'30" N.; 121°7'30" - 121°0'0" W. Interval 5 ft. Edit. of Jan. 1915.

(f) Union Island Quad. Surveyed in 1911-1912. 1:31,680. 37°52'30" - 37°45'0" N.; 121°30'0" - 121°22'30" W. Interval 5 ft. Edit. of Nov. 1914.

(g) Vernalis Quad. Surveyed in 1912. 1:31,680. 37°45'0" - 37°37'30" N.; 121°22'30" - 121°15'0" W. Interval 5 ft. Edit. of Jan. 1915.

(h) Walker Creek Quad. Surveyed in 1904. 1:31,680. 39°45'0" - 39°37'30" N.; 122°22'30" - 122°15'0" W. Interval 5 ft. Preliminary edition, Nov. 1914.

[These sheets belong to the two-inches-to-the-mile series of the Sacramento-San Joaquin Valley. All except the last sheet are contiguous sheets representing the region lying to the south and east of Stockton. The area of the last sheet (h), on the eastern third of which only topography is shown, lies at the extreme northern end of the valley.]

**Colorado.** Monument Butte Quad. Surveyed in 1912. 1:62,500. 40°30' - 40°15' N.; 107°45' - 107°30' W. Interval 50 ft. Edit. of Jan. 1915.

[The territory here shown with greater accuracy has already been published, in 1910, on half the scale, on the Danforth Hills special sheet, 1:125,000. With

the sheets Meeker and Axial (listed respectively under "Colorado" in the *Bull.*, Vol. 46, 1914, p. 554, and Vol. 47, 1915, p. 156), nearly three-quarters of this reconnaissance map have been replaced by final surveys.]

**Idaho.** Lanes Creek Quad. Surveyed in 1911-1912. 1:62,500. 43°0' - 42°45' N.; 111°30' - 111°15' W. Interval 50 ft. Edit. of Jan. 1915.

**Illinois.** Gillespie Quad. Surveyed in 1912. 1:62,500. 39°15' - 39°0' N.; 90°0' - 89°45' W. Interval 20 ft. Edit. of Jan. 1915.

**Montana.** (a) Spring Valley Quad. Surveyed in 1909-1910. 1:62,500. 48°30' - 48°15' N.; 106°15' - 106°0' W. Interval 20 ft. Edit. of Jan. 1915.

(b) Topographic Map of Glacier National Park, Montana. Surveyed in 1900-1904 and 1907-1912. 1:125,000. 49°0' - 48°13' N.; 114°30' - 113°10' W. Interval 100 ft. Edition of Dec. 1914. Also accompanies, as Pl. xiii, "The Glacier National Park: A Popular Guide to Its Geology and Scenery" by M. R. Campbell, *U. S. G. S. Bull.* 600, 1914.

[This is a new edition of the special map of Glacier National Park, first published in 1911 (see, under "Montana (b)," *Bull.*, Vol. 44, 1912, p. 398). The innovation is that the usual representation of contours is supplemented by shading. This greatly heightens the plasticity of the map—how greatly can be seen by comparing it with the first edition. On this the contours, while admirably portraying the glacial topography, do not succeed in bringing out the mountain massifs, although due to their closeness they have, in such a case as this, their maximum force of expression. But, as has frequently been pointed out in this department, contours alone are not able to give a synoptical view of relief. This innovation therefore, while not quite attaining the excellence of A. O. Wheeler's similar map of the Selkirks along the Canadian Pacific Railway or the admirable maps of the Swiss school—sometimes there is a lack of firmness in the handling of the crayon and the shading occasionally has a smudgy appearance—is to be welcomed as opening up a new and important field of cartographic expression in our foremost government map-issuing bureau.]

The publication, since the first edition, of the Marias Pass and Nyack sheets (see under "Montana," *Bull.*, Vol. 45, 1913, p. 955, and Vol. 46, 1914, p. 954) has been made use of, so that now topography covers the whole sheet with the exception of the rectangle in the lower left-hand corner limited by the parallels of 48°30' and 48°13' and the meridians of 114°30' and 114°0'. The shading has been applied, however, only within the administrative area of the park. In the representation of the glaciers it is to be regretted that, for this region for which they are so characteristic, the Survey had not already adopted its present adequate representation by blue contours instead of the rather stiff and sketchy manner then prevailing. However, this is an improvement which, we may hope, will spread in the next edition from the diminutive Stanton and Grant Glaciers (copied from the recent Nyack sheet) to the whole glacier area of the map. In the edition accompanying *U. S. G. S. Bull.* 600 the Lewis overthrust fault is shown.]

**New York.** Corning Quad. Surveyed in 1912. 1:62,500. 42°15' - 42°0' N.; 77°15' - 77°0' W. Interval 20 ft. Edit. of Nov. 1914.

**Ohio.** (a) Fredericktown Quad. Surveyed in 1912. 1:62,500. 40°30' - 40°15' N.; 82°45' - 82°30' W. Interval 20 ft. Edit. of Jan. 1915.

(b) Loudonville. Surveyed in 1912. 1:62,500. 40°45' - 40°30' N.; 82°15' - 82°0' W. Interval 20 ft. Edit. of Dec. 1914.

(c) Perrysville. Surveyed in 1912. 1:62,500. 40°45' - 40°30' N.; 82°30' - 82°15' W. Interval 20 ft. Edit. of Jan. 1915.

[On map (c) woods are shown in green.]

**Vermont.** Milton Quad. Surveyed in 1913. 1:62,500. 44°45' - 44°30' N.; 73°15' - 73°0' W. Interval 20 ft. Edit. of Jan. 1915.

#### Other Separate Maps

**United States.** [Six base maps of various states, 1:500,000]: (1) State of Montana. Compiled in 1913. In 2 sheets. (2) (States of New Hamp-

shire and Vermont.) Compiled in 1911-1914. (3) State of Oregon. Compiled in 1914. (4) State of Virginia. Compiled in 1914 in cooperation with the State of Virginia, Geological Survey, Thomas L. Watson, Director. (5) State of West Virginia. Compiled in 1914. (6) (State of Wyoming.) Compiled in 1913. All states compiled under the direction of R. B. Marshall, Chief Geographer, by A. F. Hassan, Cartographer.

[These maps belong to the important series of black-and-white outline state maps being issued by the U. S. Geological Survey. The addition of these maps brings the total of states published to date to 30. Vermont has already been published separately. For previous states issued and detailed comment see under "United States" and under "Southern New England" and "Washington," *Bull.*, Vol. 46, 1914, pp. 713-714 and p. 955.]

**United States.** United States: Oil and Gas Fields in 1913. By David T. Day and others. 1:2,500,000. 52°-24° N.; 129°-65° W. 5 colors. With inset: Alaska. [1:11,000,000]. 3 colors.

[On the standard base map of the United States are shown, in colors, the areas of defined oil and gas pools and, by symbols, differentiation is made between productive (1) oil and (2) gas localities and (3) noteworthy occurrences of either without present production. In addition are shown the trunk oil pipe lines, with the names of the companies controlling them. This brings out forcibly their remarkable extent, reaching continuously all the way from the Beaumont field on the Gulf coast of Texas via Kansas City and Chicago to New York, with an isolated system between San Francisco and Los Angeles. It seems as if the same information might have been conveyed on a less wieldy map, say, the base map on the scale of 1:7,000,000.]

#### U. S. COAST AND GEODETIC SURVEY

**Philippine Islands.** (a) Philippine Islands, Southwestern Part. [1:800,000]. 11°40'-4°20' N.; 116°34'-122°9' E. 2 colors. Chart No. 4707. Feb. 1915. 50 cts.

(b) Mayo Bay to Cateel Bay, East Coast of Mindanao. [1:100,000]. 7°54'-6°59' N.; 125°10'-126°50' E. 1 color. Chart No. 4626. Jan. 1915. 40 cts.

#### EUROPE

**Europe.** Waldkarte von Europa. Entworfen von Dr. Joh. Riedel. 1:15,000,000. 75°-30° N.; 43° W.-85° E. 9 colors. Accompanies "Die Verbreitung des Waldes in Europa" by J. Riedel, *Petermanns Mitt.*, Vol. 60, II, 1914, Sept., pp. 128-131.

[Eight percentages of forest covering are distinguished. While in Germany and Austria-Hungary these are generalized, for the remaining countries they are based on administrative divisions, a treatment which, especially in the case of Russia, militates against reflecting the natural condition. The Iberian and Balkan peninsulas (except for Servia and Bulgaria in their pre-Balkan war boundaries) are not included in the representation.]

#### POLAR

**Arctic.** Arbeiten der hydrographischen Expedition in das Nördliche Eismeer im Jahre 1913 unter Kapt. Wilkizki. Mean scale 1:600,000. 82°-64° N.; 94° E. 167° W. 7 colors. Accompanies note on "Kapt. A. Wilkizkis Forschungen im Sibirischen Eismeer" by H. Wichmann, *Petermanns Mitt.*, Vol. 60, II, 1914, Sept., p. 138.

[Map of the Siberian coast between Cape Chelyuskin and East Cape showing the surveys made on the expedition under Capt. Vilkitski on which new land was discovered north of Cape Chelyuskin. This new land, Emperor Nicholas II Land, is here shown as two separate masses instead of one, as on the previously published approximate maps. The present map is based on one furnished by Capt. Vilkitski himself. Besides showing the track of his vessels, the various sections of the coast are distinguished according to the dates of their

survey. Four periods are differentiated: (1) surveys of 1734-1742 and 1821-23, as shown on the 1874 edition of Chart No. 229 of the Russian Hydrographic Office; (2) surveys of 1882-1910; (3) surveys of 1911-12; (4) surveys of the 1913 expedition. The last relate to the eastern coast of the Taimyr Peninsula, in addition to that of Nicholas II Land, and to Chaun and Kolyuchin Bays.]

## EDUCATIONAL

**North and South America.** [Two wall maps:] (1) The Graphic Relief Map: North America. Designed and drawn by Georg Thorne-Thomsen. 1:6,336,000. 80°-3° N.; 175°-20° W. 3 colors. (2) The Graphic Relief Map: South America. Designed and drawn by Georg Thorne-Thomsen. 1:6,336,000. Printed by Edwards & Deutsch Litho. Co., Chicago; published by A. J. Nystrom & Co., Chicago, 1914. Cloth-backed, with roller at top and bottom, \$4.00 each.

[These two wall maps belong to a series of six, containing, in addition, Africa and Eurasia on the same scale and the United States and Europe in 1:3,168,000. Their main feature is the representation of relief in a way to give the effect of a model. This is attained by means of gray stippling decreasing in density with increasing altitude and by means of a strongly shaded representation of mountain ranges. The result is, on the whole, a bold differentiation between mountainous and non-mountainous regions. In the latter the broader areas of different altitude are hardly, however, satisfactorily brought out by the stippling: there is practically no distinction, for instance, between the Appalachian Plateau and the low Prairie Region. Absolute differences of elevation are, after all, best represented by layer tints; but as the author, in an informational circular, expresses his disapproval of this method because of the "elaborate instruction" required for pupils to learn the key, the judgment of his maps must be restricted to the success with which they give the impression of relief models. It is comparison with photographs of such admirable models as those made by the late Edwin E. Howell which bring out the weakness of the present series: too stiff a treatment of relief. There is too great a predominance of the ridge form in the representation of mountains and too few indications of broad uplifts; the general effect is of isolated chains rising abruptly from their surroundings. This form prevails even in such denudation masses as the Guiana Highlands, which have the appearance of young folded mountains. The mountain ranges, too, are strongly suggestive of the perspective drawings of medieval maps—a somewhat belated method in a day when perpendicular projection of all elements (which does not, of course, exclude side illumination to bring out relief) dominates the cartographic field. Bordering the continental shelf is distinguished, but as its tint differs only slightly from the rest of the ocean, it can hardly be seen at a distance of fifteen feet. A few errors in content may be noted: the ranges of the upper part of the Alaska Peninsula and those of eastern Honduras and Nicaragua run counter to their actual trend; the Alaska Range, with the characteristic sweep of its arc, is practically unrepresented in its culminating portion, while the Endicott Range is entirely absent. The maps of the series are published without and with names; in the latter case there is a judicious restriction to a few. On the map of South America Callao and Aconcagua are misspelled.]

**Morocco.** [Physical wall map of] Maroc, par Maurice Fallex, Professeur au Lycée Louis-le-Grand. 1:1,000,000. 36½°-28° N.; 12½° W.-¼° E. 10 colors. With four insets: (1) Carte Géologique d'après Louis Gentil. 1:3,000,000. 37½°-28° N.; 11° W.-¼° E. 11 colors. (2) Tanger. 1:10,000. 3 colors. (3) Fez. 1:30,000. 2 colors. (4) Marrakech. 1:30,000. 2 colors. Librairie Ch. Delagrave, Paris.

[Good physical wall map whose main value lies in its representing the region on a much larger scale than usually available. Relief is represented in four hypsometric tints and shading. Railroads, roads and French steamship lines are shown in red. The nomenclature is somewhat too copious for educational purposes.]

## Other Maps Received

## NORTH AMERICA

## CANADA

**Alberta.** Map showing [grain] elevators in Manitoba, Saskatchewan and Alberta. 25 mi. to 1 in. Dept. of the Interior, Ottawa, 1915.

Map showing gauging stations in Alberta and Saskatchewan. 35 mi. to 1 in. Accompanying "Report of Progress of Stream Measurements for the calendar year 1913."

**British Columbia.** Sheet Map, British Columbia. 2 mi. to 1 in. Fernie Sheet. Surveyor General's Office, Victoria, B. C., 1913.

Degree Series, British Columbia. 2 mi. to 1 in. Windermere sheet. Surveyor General's Office, Victoria, B. C., 1914.

**Manitoba-Saskatchewan-Alberta.** Map of Manitoba, Saskatchewan and Alberta, showing the number of quarter-sections available for homestead entry in each township, also the pre-emption and purchased homestead area as defined by the Dominion Lands Act, 1908. 35 mi. to 1 in. Dept. of Interior, Ottawa, 1915.

**Ontario.** Standard Topographical Map. 1:250,000. Sheet: Manitoulin, Ontario. Dept. of the Interior, Ottawa, 1914.

## UNITED STATES

**Alaska.** Post route map of the territory of Alaska showing post offices, with intermediate distances on mail routes in operation on the 1st of Oct. 1914. 40 mi. to 1 in. Post Office Department, Washington, 1914.

**Colorado.** Map of Colorado showing all railroads. 20 mi. to 1 in. Railroad Commission, Denver, 1911.

**Illinois.** Tillotson's pocket maps and street guide of Chicago and suburbs, of Highland Park, Glencoe, Winnetka, Kenilworth, Wilmette, Evanston, Franklin Park, Maywood, River Forest, Oak Park, Riverside, La Grange, Morgan Park, Indiana Harbor and Gary, Indiana. 3 in. to 1 mi. M. D. Tillotson, Chicago, 1909.

**Michigan, etc.** Maps of Michigan, Minnesota, North Dakota, South Dakota, Wisconsin and Counties served by the "Soo Line." Various scales. The Minneapolis, St. Paul & Ste. Marie Ry. [New York Office], 1913.

**United States.** [Maps by American Automobile Association]. 1, General map of transcontinental routes with principal connections, 110 mi. to 1 in.; 2, Main traveled routes through New York State, 17 mi. to 1 in.; 3, Routes between the northern states, middle western states and the South, 75 mi. to 1 in.; 4, Main traveled routes through Maryland-Virginia, 15 mi. to 1 in.; 5, Main traveled routes through Pennsylvania, 9 mi. to 1 in.; 6, Special Hudson River district, 5½ mi. to 1 in. American Automobile Association, New York, 1914.

**United States.** [36] Post route maps showing post offices, with intermediate distances on mail routes in operation on the 1st of Oct. 1914: (1) Alabama, 8½ mi. to 1 in. (2) Arizona, 12 mi. to 1 in. (3) Arkansas, 9 mi. to 1 in. (4) California, 10 mi. to 1 in. (5) Colorado, 5 mi. to 1 in. (6) Florida, 10 mi. to 1 in. (7) Georgia, 8 mi. to 1 in. (8) Illinois, 8½ mi. to 1 in. (9) Indiana, 7 mi. to 1 in. (10) Iowa, 7 mi. to 1 in. (11) Kansas, 10 mi. to 1 in. (12) Kentucky, 7 mi. to 1 in. (13) Louisiana, 9 mi. to 1 in. (14) Maine, 6½ mi. to 1 in. (15) Maryland, 5 mi. to 1 in. (16) Massachusetts, 5 mi. to 1 in. (17) Michigan, 9 mi. to 1 in. (18) Minnesota, 10 mi. to 1 in. (19) Mississippi, 8 mi. to 1 in. (20) Missouri, 8½ mi. to 1 in. (21) Montana, 12 mi. to 1 in. (22) New Hampshire, 5 mi. to 1 in. (23) New Jersey, 4 mi. to 1 in. (24) New Mexico, 12 mi. to 1 in. (25) New York, 5 mi. to 1 in. (26) North Carolina, 8 mi. to 1 in. (27) North Dakota, 10 mi. to 1 in. (28) Ohio, 7 mi. to 1 in. (29) Oklahoma, 10 mi. to 1 in. (30) Oregon, 10 mi. to 1 in. (31) Pennsylvania, 5 mi. to 1 in. (32) South Dakota, 10 mi. to



1 in. (33) Texas, 12 mi. to 1 in. (34) Utah, 10 mi. to 1 in. (35) Virginia, 7 mi. to 1 in. (36) Washington, 9 mi. to 1 in. Post Office Department, Washington, 1914.

**Virginia.** Map of Fairfax County, Virginia. Compiled by Columbus D. Choate. [1:576,000] Columbus D. Choate, Herndon, Va., 1911.

## CENTRAL AMERICA AND WEST INDIES

**Panama Canal Zone.** Post route map of the Canal Zone (Isthmus of Panama) showing post offices, with intermediate distances on mail routes in operation on the 1st of Oct. 1914.  $1\frac{1}{2}$  mi. to 1 in. Post Office Dept., Washington, 1914.

Isthmian Canal Commission. Chart no. 1 of the Panama Canal, from Limon Bay to Mile 29. Chart no. 2, from Mile 29 to Panama Bay. Projected from trigonometrical surveys made by the Isthmian Canal Commission 1904-1914. 1:40,000. [Isthmian Canal Commission, Washington, 1914. Obtainable from U. S. Hydrographic Office at 20 cents each.]

**Porto Rico.** Post route map of Porto Rico showing post offices, with intermediate distances on mail routes in operation on the 1st of Oct. 1914. 5 mi. to 1 in. Post Office Dept., Washington, 1914.

## SOUTH AMERICA

**Argentina.** Provincia de Salta. 1:25,000. [7 sheets]: Salta; Las Islas; Cerrillos; G'ral Alvarado; La Caldera; San Lorenzo; San José. [From Instituto Geogr. Militare, Buenos Aires, 1914.] 1912.

**Brazil.** Mapa geral do Brasil. Segunda edição popular do *Jornal do Brasil*. 1:5,000,000. *Jornal do Brasil*, Rio de Janeiro, 1913.

Schema da carta do Brazil mostrando o itinerario da Expedição Roosevelt-Rondon. 1:15,000,000. Accompanying "Through the Brazilian Wilderness" by Theodore Roosevelt. 1914.

**Paraguay.** Mapa de la República del Paraguay, levantado por Félix Daumas Ladouce. 1:1,200,000. Inset: Ciudad de Asuncion, 1:1,500. [Gift from the Honorable Minister from Paraguay, Washington, D. C.], 1906.

**Peru.** Weberbauer: Pflanzenwelt der peruanischen Anden. 1:10,000,000. Accompanying "Die Vegetation der Erde, XII: Die Pflanzenwelt der Peruanischen Anden" von Prof. Dr. A. Weberbauer. 1911.

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**Anglo-Egyptian Sudan.** Africa. 1:1,000,000. Sheet North-B-36, Mon-galla. Geographical Section, General Staff, London, 1914.

**Eritrea.** Carta della Colonia Eritrea. 1:1,500,000. Ministero degli Affari Esteri, Direzione centrale degli Affari Coloniali. [Roma], 1912.

Commissariato dell' Aechelè-Guzai. 1:600,000. Ministero delle Colonie. [Rome, 1913].

Commissariato di Assab. 1:800,000. Ministero delle Colonie [Rome, 1913].

Commissariato di Cheren. 1:600,000. Ministero delle Colonie [Rome, 1913].

Commissariato del Gasc et Setit. 1:800,000. Ministero delle Colonie [Rome, 1913].

Commissariato dell' Hamasen. 1:500,000. Ministero delle Colonie [Rome, 1913].

Commissariato di Massaua. 1:800,000. Ministero delle Colonie [Rome, 1913].

Commissariato del Seraè. 1:600,000. Ministero delle Colonie [Rome, 1913].

**Italian Somaliland.** Somalia Italiana. Regioni di nuova occupazione. 1:2,500,000. Ministero delle Colonie [Rome], 1914.



**Libya.** Commissariato del Barca. 1:800,000. Ministero delle Colonie. [Roma], [1913].

Carta dimostrativa della Cirenaica. 1:1,000,000. Ministero delle Colonie [Rome], 1914.

Carta del Regno d'Italia e della Libia. 1:2,500,000. La Follia di New York, New York [1914].

Carta dimostrativa delle rovine di Zuagha (Sabratha). 1:12,500. Ministero delle Colonie [Rome], 1914.

**Madeira.** General map of the Island of Madeira. 1:100,000. Accompanying "Tourist's Guide to the Island of Maderia," compiled by C. A. Power, 1914.

**Uganda.** Routenskizze der Rudolf Kmunke'schen Expedition in Uganda (Zentralafrika), Oktober 1911-April 1912. 1:760,000. Accompanying Rudolf Kmunke: "Quer Durch Uganda, eine Forschungsreise in Zentralafrika 1911-1912," 1913.

Karte des Kraters vom Berg Elgon in Uganda. Photogrammetrisch aufgenommen von Architekt Rudolf Kmunke auf seiner Forschungsreise Oktober 1911-April 1912. 1:40,000. Accompanying Rudolf Kmunke: "Quer durch Uganda, eine Forschungsreise in Zentralafrika 1911/1912," 1913.

[Reviewed under "Uganda" in *Bull.*, Vol. 45, 1913, p. 877.]

**Union of South Africa.** Index to the Geological map of the Union of South Africa. 1:3,000,000. Accompanying Part V, Annual Reports for 1913, Geological Survey of Union of South Africa, 1914.

Portions of Barberton and Carolina Districts, Transvaal. 2½ mi. to 1 in. Accompanying Part V, Annual Reports for 1913, Geological Survey of Union of South Africa. 1914.

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**China.** Geology of the country around Yünnan-Fu. 1 in. to 4 mi. Accompanying "Records of the Geological Survey of India," Vol. XLIV, Part 2. 1914.

**Dutch East Indies.** Java en Madoera. Aangevende den stand der invoering van de nieuwe landrente-regeling. 1:1,000,000. Accompanying "Jaarverslag van den Topographischen Dienst in Nederlandsch-Indië over 1913." Deel II.

**India.** Map of Mysore, showing the actual annual rainfall for 1912. 15 mi. to 1 in. Accompanying "Report on Rain-Fall Registration in Mysore for 1912" by N. V. Iyengar.

**Korea.** Map of Chosen (Korea). 1:2,400,000. Accompanying "Annual Report on Reforms and Progress in Chosen (Korea), 1911-1912."

Geological map of Korea state. 1 in. to 4 mi. Accompanying "Records of the Geological Survey of India," Vol. XLIV, Part 3, 1914.

Plan of Jinsen (Chemulpo) Harbour. 1:6,000. Accompanying "Annual Report on Reforms and Progress in Chosen (Korea), 1911-1912."

Plan of Fusan Harbour. 1:9,000. Accompanying "Annual Report on Reforms and Progress in Chosen (Korea), 1911-1912."

**Philippine Islands.** Post route map of the Philippine Islands showing post offices, with intermediate distances on mail routes in operation on the 1st of Oct. 1914. 9 mi. to 1 in. Post Office Dept., Washington, 1914.

## AUSTRALASIA AND OCEANIA

**Australia.** Relative cost of living (Nov. 1913) in relation to distribution of population. [1:18,000,000]. Accompanying "Official Year Book of the Commonwealth of Australia," no. 7. 1914.

Map of New South Wales [showing minerals]. 64 mi. to 1 in. Accompanying "Official Year Book of New South Wales, 1913."

Principal occurrences in South Australia of [19 enumerated minerals]. 48 mi. to 1 in. Accompanying "Annual Report of the Government Geologist [of South Australia]," 1914.

**Hawaii-Samoa-Guam.** Post route map of Hawaii, Samoan Islands, and Guam showing post offices, with intermediate distances on mail routes in operation on the 1st of Oct. 1914. 9 mi. to 1 in. Post Office Dept., Washington, 1914.

**Mariana Islands.** Insel Rota. 1:100,000. Accompanying *Deutsche Rundschau für Geographie*, Vol. 37, 1914/15, No. 4.

**Tasmania.** Map of Tasmania. 8 mi. to 1 in. Surveyor General's Office, Hobart [1913?].

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**Austria.** G. Freytags Wiener Bezirksplankarten. XXI. Bezirk, Floridsdorf. 1:15,000. Freytag & Berndt, Wien [1914].

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**France.** Limites des langues d'Oc et d'Oil. 1:280,000. Accompanying *Revue de Géogr. Commerciale*, mai 1913.

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✱ **Norway.** Karte over rikstelegrafens og private telefonselskapers linjer i det sydlige Norge. — i det nordlige Norge. [1:800,000]. Rikstelegrafens Materialkontor, Christiania, 1913.

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**Rumania.** Die Moldau. Harta 1, orographische skizze; 2, Die Bevölkerungsdichte nach natürlichen Gebieten berechnet, 1:800,000. Accompanying "Die Bevölkerungsdichte der Moldau" von Al. Gh. Dimitrescu. 1909.

**Spain.** Plano de Orense, revisado por el Ayuntamiento. 1:3,750. A. Martín, Editor, Barcelona [1915].

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**Switzerland.** Map indicating the special regulations concerning motor-car traffic in Switzerland. 1:500,000. Eidg. Departement des Innern, Bern [1914].

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